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ABSTRACT

The guide presents annotations on 335 resources, journal articles, books, associations, and reports dealing with computer utilization for handicapped persons in rehabilitation and education. Author and subject indexes precede the annotations which are arranged alphabetically. Citations usually include information on title, author, source, date, and address as well as a brief summary. The following subjects are among those addressed in the resource guide: communication (functional aids, speech recognition, speech synthesis, systems, and touch sensitive monitors), computer assisted instruction, functional aids for communication and self-help/independent living, computer management, research, and computer software. (CL)

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Computer Technology for the Handicapped in Special Education and Rehabilitation: A Resource Guide

Volume II

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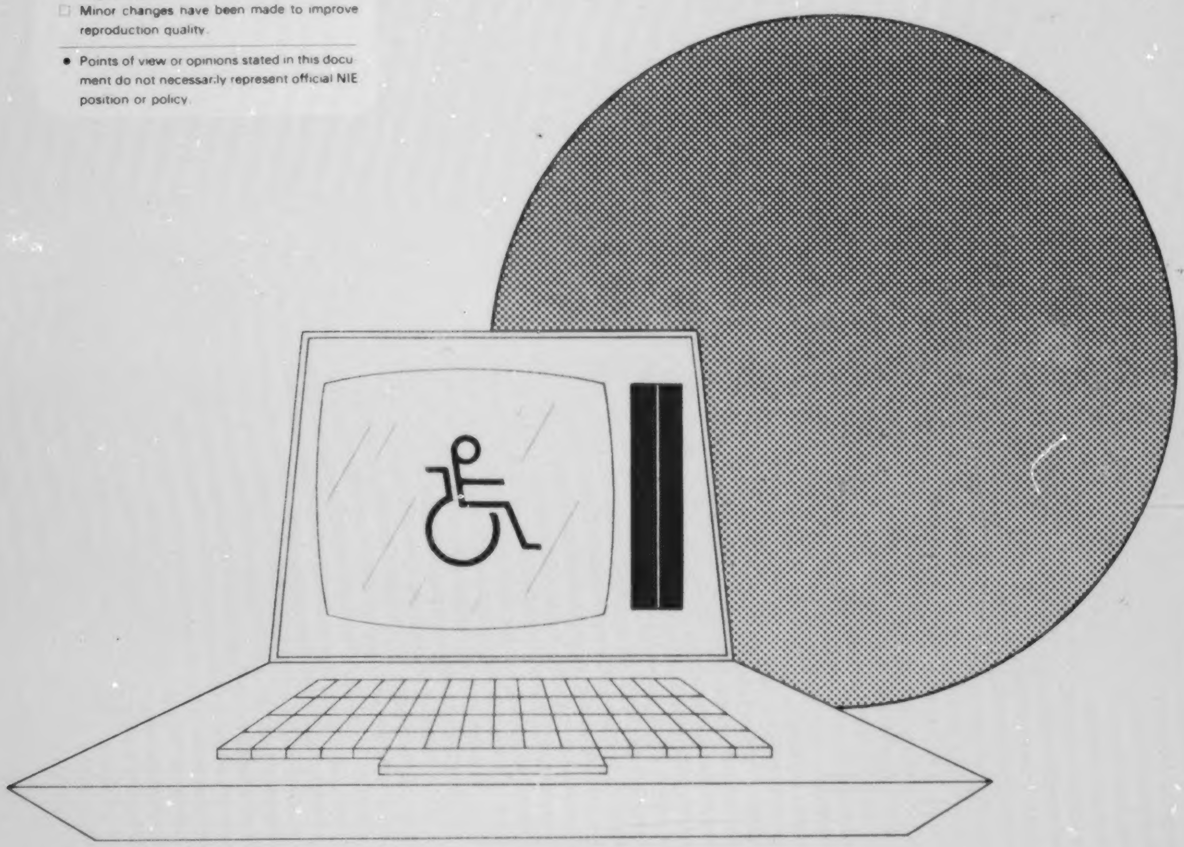

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INTERNATIONAL COUNCIL FOR COMPUTERS IN EDUCATION
ICCE Publications

Philip Browning
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Now available are two annotated bibliographies on one of the largest collections of literature on the application of computer technology with the handicapped. These two volumes present an extensive coverage of informational resources up to 1985. ***Resource Guide I*** describes 191 resources through 1982 and the newly published ***Resource Guide II*** describes over 300 more recent resources.

This library of materials provides an expeditious means for both becoming familiar with the breadth of activities in the area, as well as delving more deeply into specific subject areas of personal interest. ***Resource Guides I & II*** can be a useful source of information for educators, practitioners, researchers, administrators, students, and consumers on both special education and rehabilitation.

Comprehensiveness

- **Guides I & II** represent an array of computer applications including computer assisted instruction, computer management in both special education and rehabilitation, and functional aids.
- **Guides I & II** represent specific physical and developmental disabilities including mentally retarded, learning disabled, visually impaired, hearing impaired, nonvocal, quadriplegic, autistic, emotionally handicapped, and cerebral palsied.
- **Guides I & II** represent a wide array of resources including books, chapters in books, journal articles, research grants, organizations, newsletters, clearinghouses, special issues of journals, and unpublished manuscripts.

Utility

- All references are descriptively annotated in a manner to allow both professionals and interested lay persons to find them useful.
- An author index and subject index are provided in both ***Guide I & II*** to facilitate quicker searching for materials of interest. Many topics within the subject index are further subdivided to enhance its utility. For example, the general heading "Computer Assisted Instruction" is subdivided by "Disability Type."
- Contact persons, addresses, and phone numbers are provided where applicable to allow easier tracking of desired follow-up information.

This book is published by the International Council for Computers in Education, a non-profit, tax-exempt professional organization. ICCE is dedicated to improving educational uses of computers and to helping both students and teachers become more computer literate. ICCE publishes *The Computing Teacher*, a journal for teachers and for teachers of teachers. It also publishes various booklets of interest to educators.

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Volume II

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Introduction

Computer utilization for handicapped people has now come of age and the technological developments are far reaching. Just a few of the benefits now available include a microcomputer aided robotic arm which permits quadriplegics to feed themselves independently; computerized classroom management systems that enable teachers to tailor curriculum to individualized education plans; a talking wheelchair which helps nonvocal persons to communicate with others; computer assisted interactive video courseware to teach mentally retarded students; computer languages, such as Logo, which stress exploratory learning for children with learning dysfunctions; computer programs for the immediate translation of written materials into braille; and a musically programmed Apple II connected to a vibrating platform allowing deaf people to feel the music and dance to the beat "heard" through their feet.

These and many other similar developments are so recent that unfortunately they remain largely unknown to administrators, teachers, service providers, and users. Goldenberg (1979) speaks to this dilemma by noting there is little reference to this technology for the handicapped in current textbooks. Furthermore, the field is so new that " . . . communication, even among the concerned professionals, still tends to be sluggish and spotty" (p. 6).

A literature awareness is one way for interested persons to become better acquainted with this newly emerging technology and herein lies the purpose of Resource Guide II. In essence, such an awareness can be a beginning for many who have yet to become familiar with and accept the challenge of the contributions that computer technology can make in improving the lives of physically and developmentally disabled individuals.

Many such contributions already exist which significantly improve the quality of both special education and rehabilitation services for the handicapped. In fact, Foulds (1982) is correct in stating that, "The recent explosion in the availability of personal microcomputers has perhaps no more important benefit than in special education and rehabilitation" (p. 155). A generic model representing some of these major areas of benefit is presented in Figure 1.

	Education			Rehabilitation		
	Instruction		Management		Functional Aids	
	Student/ Client	Teacher/Service Provider	▨	▨	Communication	Independent Living
Physical Disability						
Developmental Disability						

Figure 1

A Generic Model of Computer Applications
for the Handicapped

The model includes both physical and developmental handicaps on one dimension and categorizes applications into education and rehabilitation along the other dimension. This framework is general and thus does not delineate the full range of fundamental computer usages. For example, Watts (1981) has identified 12 specific applications of microcomputers in education and Vanderheiden (1981) speaks to the same number of uses in rehabilitation. The model, however, serves to introduce the reader to the major thrusts of work published in the area and included in the Guide. The subject index is intended to assist the reader in locating the literature which relates to the model domains.

In summary, Leneway and Montgomery (1981) indicate that "The lives of many handicapped persons have been vastly improved by computer technology . . . but millions wait to be served" (p. 49). If these yet to be impacted persons are also to share in the benefits it will be necessary for professionals in the fields of special education and rehabilitation to begin incorporating this expanding technology into their practice.

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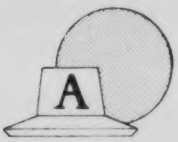


001 ABLEDATA (Network). National Rehabilitation Information Center, American Catholic University, 4407 Eighth Street, N.E., Washington, D.C., 20017.

The ABLEDATA system is a computerized data-bank containing information about rehabilitation products. This resource includes more than 4,000 commercially available aids and equipment useful to disabled persons. Information brokers are trained in the use of ABLEDATA files and provide product data from the national data banks to meet rehabilitation product needs at the local level. The system is a service of the National Rehabilitation Information Center and funded by the National Institute of Handicapped Research.

002 Adams, J., Richards, J. H., & Brav-Langer, B. (1980). Data storage and retrieval system for use in a learning disabilities clinic. *Journal of Learning Disabilities*, *13*(10), 13-15.

Describes a data storage and retrieval system developed for the Kaiser-Permanente Learning Disabilities Diagnostic Center in San Diego. The system focuses on data derived from a broad-based diagnostic work-up of children experiencing school failure. The system is based on a coding schedule and manual. The system provides for transforming 139 information items into data processing language on computer cards. The items are broken down into 12 categories: (1) identification data; (2) social history; (3) previous evaluations and remediation attempts; (4) medical history; (5) behavior, attitude, and academic performance; (6) psychoeducational screening; (7) neurological assessment; (8) class placement assessment; (9) psychosocial assessment; (10) recommendation and treatment; (11) follow-up; and (12) child and parent self-assessment. The system is flexible for uses in a variety of clinical and research settings. The authors note how the standardization of data could facilitate collaborative research in multiple settings.

003 Anderson, D. O., & Glowinski, D. J. (1982). Effective use of a computer-managed instruction program. *Journal of Learning Disabilities*, *15*(9), 555-556.

Discusses a Computer-Assisted Diagnostic/Prescriptive Program (CADPP), which is a computer-managed instructional system for record-keeping tasks. The CADPP system provides diagnosis of individual student needs in basic reading and math skills, and prescribes materials and methods to meet those needs. Other components of CADPP include standardized diagnostic/evaluative criterion referenced tests, IEPs, printed instructional prescriptions, and a system of learning stations. Suggestions for facilitating the use of a computer-managed instructional system are offered in the following areas: (1) personnel involvement, (2) program capacity, (3) microcomputer limitations, (4) personnel adjustment, (5) computer familiarity, (6) different programs, (7) instructional manual content, (8) instructional manual use, (9) entering information, and (10) finding program errors.

004 Appell, L. S., & Hurley, K. M. (1984). Individualizing instruction with microcomputer software. Focus on Exceptional Children, 16,(5), 1-12.

The many roles that the microcomputer can play in special education are listed (e.g., responsive instructor, facilitator for problem solving, gameboard, prosthesis, and manager). Discussed is the critical issue of software because the microcomputer, like a TV, is only as good as the programs for it. Teachers interested in using the microcomputer as an instructional tool must become informed and pro-active in making choices for its use with special education students. In order to do this, it is suggested that teachers: (1) read the professional literature (a list is included), (2) determine goals and objectives for its use, (3) study the software reviews, and (4) evaluate software. A resource section provides a list of software publishers, software directories and review sources, special education and technology periodicals, and clearinghouses and organizations. Also presented are the ways in which software can be developed or adapted for student use. Twenty-six commercially available authoring systems are listed and an additional four programming languages are defined.

005 Apple Computer Clearinghouse for the Handicapped. Prentke Romich Company, RD.2, Box 191, Shreve, Ohio, 44676.

This clearinghouse specializes in materials on microcomputers for handicapped individuals. A catalogue is available which summarizes software/courseware for the handicapped.

006 Archer, P., & Mitakes, M. (Project Directors) (1983-1985). The impact of microcomputer instruction on handicapped students. (Office of Instruction, Planning/Research, Valentines Road and The Plain Road, Westbury, New York, 11590; (812) 335-5847) Grant awarded from the U.S. Department of Education.

The purpose of this project is to study the overall effectiveness of computer assisted instruction for preschoolers. The study, which is directed toward preschool handicapped children who are cognitively, communicatively, and multiply impaired, will also address questions related to scheduling, type of software, microcomputer location in the school, and a range of other administrative and organizational issues.

007 Ashcroft, S. C. (Ed.) (1984). Microcomputers for visually impaired learners: Access by touch, hearing, and remaining vision. Education of the Visually Handicapped (Special Issue), 15(4).

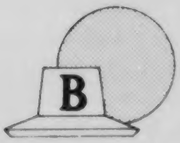
This special issue includes four articles on the following topics: (1) "Research on multimedia access to microcomputers for visually impaired youth," (2) "Evaluating microcomputer access technology for use by visually impaired students," (3) "Independence for the visually handicapped through technology," and (4) "A formative evaluation of an instructional program designed to teach visually impaired students to use microcomputers."

008 Ashcroft, S. C. (1984). Research on multimedia access to microcomputers for visually impaired youth. *Education of the Visually Handicapped*, *15*(4), 108-118.

The purpose of this research project is to study visual, auditory, and tactile means to allow the visually impaired access to microcomputers. The five objectives are to: (1) study microcomputer systems accessible through touch, voice, or enlarged print; (2) develop and evaluate instructional programs for teaching visually impaired youth to use these multimedia microcomputer systems through access technology; (3) evaluate selected adapted, or specifically developed CAI programs; (4) develop and evaluate related instruction for in-service and pre-service training of special education personnel; and (5) disseminate the results and products of the program. Visually impaired students require special means of access. Access technology is defined as equipment, interfacing, software, and instructional materials that enable independent use by visually impaired persons. Some commercially available peripherals are voice synthesis, braille reading and writing equipment, and Optical-to-Tactile Converter (OPTACON). A list of 15 access devices includes detailed information on visual acuity, number of persons served, degree of specialization, and input and output and graphics capabilities. A policy with evaluative criteria was developed for choosing software.

009 *Association for the Development of Computer-Based Instructional Systems* (ADCIS). ADCIS Headquarters, Miller Hall 409, Western Washington University, Bellingham, Washington, 98225.

ADCIS is an international organization for professionals in the field of instructional technology. It provides members with publications, conferences, and workshops. Educators of the Handicapped is one of several special interest groups.



010 Bailey, M. N., & Raimondi, S. (1984). Technology and special education: A resource guide. *Teaching Exceptional Children*, *16*(4), 273-277.

Presents a selection of eight resources, seven periodicals, six books, seven organizations, six projects, and three networks designed for special educators (information includes names, addresses, costs, and descriptions of each). The authors are working on Project EduTech which is funded by the Office of Special Education Programs to assist special educators in reviewing the growing lists of materials and resources relating to the use of technology. More information can be requested by contacting Project EduTech, JWK International Corporation, 7617 Little River Turnpike, Annandale, Virginia, 22003.

011 Barresi, J. (Project Director) (1983-1986). Microcomputer applications in special education. (The Council for Exceptional Children, 1920 Association Drive, Reston, Virginia, 22091; (703) 620-3660) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a training manual and curriculum (six modules) on microcomputers in special education for educators and administrators in the field. The focus of the six modules, which will be field tested in a series of workshops, is: (1) selection and decision-making process on the use of microcomputers in special education, (2) software and hardware evaluation, (3) adapting special education curriculum materials for use on microcomptuer, (4) computer operations and special education utilization, (5) utilizing peripherals for special education, and (6) microcomputer programming for instruction and management.

012 Barth, R. (1984). HEX--the handicapped educational exchange. The Pointer, 28(2), 32-35.

Describes the Handicapped Educational Exchange (HEX), a microcomputer-based electronic mail system. The system serves as a clearinghouse for information on use of technology to aid the handicapped and as an electronic mail system for the hearing impaired. Listed are some subjects covered in the HEX database and the procedures for using it. The author discusses the use of electronic mail systems by the hearing impaired and gives instructions for locating a local Computer Bulletin Board.

013 Bates, M., & Wilson, K. (1981). ILIAD: Interactive Language Instruction Assistance for the Deaf (Final Report No. 4771). Washington, D.C.: Special Education Programs.

Describes the syntactic, semantic, and tutorial components of the Interactive Language Instruction Assistance for the Deaf (ILIAD) system and the steps that have been taken to implement ILIAD on the microcomputer. Explained is the ILIAD design allowing for interactivity in a tutorial environment. The deaf learner specifies the content for each lesson and ILIAD in turn creates an individualized lesson according to the learner's specifications. An overview of the linguistic and tutorial features of the ILIAD system are presented. Additional sections presented include: (1) the mechanism of transformational grammar used in the generation of sentences, (2) the language tutorials used to mediate between the sentence generating mechanism and the student, (3) the system development tools including flexible constraints, and (4) the implementation of MicroILIAD including the subsystems of utility and generation. The report concludes with a list of papers, reports, and presentations given as part of an ongoing dissemination effort.

014 Beckerman, J. (1983). You don't have to know the language. The Computing Teacher, 10(6), 23-25.

Describes experiences of special education students using microcomputers in junior high school. The students were highly motivated and learned basic commands (LOAD, RUN) to facilitate independent use of educational software. Furthermore, each student was required to read software directions independently and to explain word processing which was used in conjunction with computer graphics to produce a magazine.

015 Behrmann, M. (1984). Handbook of Microcomputers in Special Education. San Diego, CA: College-Hill Press.

Provides an overview of computer applications in special education and related fields. The book is divided into three major parts: (1) how computers work and their types of application, (2) current applications for various populations of exceptional individuals including the gifted, and (3) how to begin implementing the uses as well as what the future might look like. The book, which is intended as a resource for pre-service or in-service training, focuses on the understanding of computers and comparing the characteristics of computers to good teaching practices including curricula used presently to meet the needs of the exceptional learner. It addresses the issue of special learning needs and discusses specific learning and tool applications of computers to meet these needs. The applications section also includes a chapter addressing the use of the computer as a management tool meeting the needs of administrators and teachers. Explained are ways to train personnel and evaluate both software and hardware for use in the classroom. The text concludes with a look at future directions in special education with explanations of integrated software, interactive videodiscs, networking, artificial intelligence, and prosthetics.

016 Behrmann, M. (1984). A brighter future for early learning through high tech. The Pointer, 28(2), 23-26.

Discusses computer use with handicapped infants and toddlers. The software programs described include: (1) Learning with Leeper from Atari; (2) Stickybear ABC by Xerox Education Publications; (3) Kindercomp; and (4) Facemaker, both by Spinnaker. The author addresses preschool-level computer education in daycare and learning center settings and the use of computers to teach handicapped infants cause-and-effect and choice-making relationships. Included is a five-step sequence used to develop a learning program to train preschoolers on the computer.

017 Behrmann, M., & Lahm, L. (1983). Proceedings of the National Conference on the Use of Microcomputers in Special Education. Hartford, CT: The Council for Exceptional Children.

This book contains thirty-five papers and abstracts presented at the conference. The proceedings are organized thematically so as to provide the reader with a practical means of finding pertinent information as well

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as comparing and synthesizing the information presented at the conference. The table of contents provides an overview of the thematic categories included in the proceedings. These sections are: (1) "Overview of microcomputers in special education," (2) "Computers in special education management," (3) "Teacher training," (4) "Instructional applications with computers," (5) "Computers as tools," and (6) "Commercial resources."

018 Bell, S. (Project Director) (1983-1987). Project RECIPE (Research exchange for computerized individualized programs of education). (Project RECIPE, 1001 S. School Street, Sarasota, Florida, 33577; (813) 924-5800) Grant awarded by the U.S. Department of Education.

The purpose of Project RECIPE, a computerized instructional management system, is to assist special education instructors in developing individualized education plans (IEPs). The system includes a bank of instructional objectives in basic skills accompanied by two forms of a criteiron-referenced assessment system and more than 2,400 instructional strategies correlated by number to each objective. Student activity books, audio tapes, teacher guides, and answer books are provided for 25 basic skills. Additional planning materials, parent resource materials, and student reward systems are built into the RECIPE system.

019 Bender, M., & Church, G. (1984). Developing a computer-applications training program for the learning disabled. Learning Disabilities, 3(8), 91-102.

Addresses the development of COMP-TREX, a computer training program to develop staff computer competencies through practical experience. The model describing COMP-TREX is comprised of six phases that affect the model's structure and processes: (1) awareness, (2) identification, (3) strategy, (4) design, (5) feedback, and (6) application. These six subsystems divide the process of providing computer literacy training for teachers of the learning disabled into phases of work or categories of information development. The authors discuss integrated classroom computer use and problems students experience in using the BASIC computer language. In essence, the students need a failure free system, social-interpersonal skills, immediate positive reinforcement, survival s[illegible]lls, a sense of competence, and a multisensory instructional format. The super-Pilot software system provides an introductory approach to computer programming for learning disabled students.

020 Bennett, R. E. (1984). Myths and realities in automating special education information management. Journal of Learning Disabilities, 17(1), 52-54.

Discusses five common misconceptions about and three advantages to automating special education management information . The misconceptions include: (1) an automated system will save money, (2) an automated system will make special education run right, (3) an automated system will run itself, (4) an automated system will always be right, and (5) an automated system will meet all its own needs. The three advantages include the potential for faster access to information, greater accuracy of information, and the possibility for new types of information.

021 Bennett, R. E. & Maher, C. A. (1984). Microcomputers and Exceptional Children. New York: Haworth Press.

This book presents an overview of the possible and real uses of microcomputers with exceptional learners. The topics addressed are: (1) microcomputers and exceptional children, (2) computer-based assessment of special-needs students, (3) the microcomputer as a perceptual tool, (4) instructional uses of microcomputers with elementary aged mildly handicapped children, (5) microcomputer technology and related services, (6) training special education personnel for effective use of microcomputer technology, (7) evaluating microcomputer programs, (8) assessing and facilitating school readiness for microcomputers, and (9) using microcomputers for administrative purposes.

022 Berenberg, W. (Project Director) (1983-1988). Universal communication system for severely impaired non-vocal persons. (Rehabilitation Engineering Center, Children's Hospital Medical Center, 300 Longwood Avenue, Boston, Massachusetts, 02115; (617) 735-6594) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a universal communication system (UNICOM), a device that accepts a wide variety of interface devices that permit control by non-vocal severely impaired persons. Accessed devices would include computers, speech synthesizers, printers, etc.

023 Birkenholz, J. (Project Director) (1983-1984). The development of microcomputer skills of special education teachers. (Illinois State University, Department of Special Educational Development, Fairfield Hall 109, Normal, Illinois, 61761; (309) 438-5419) Grant awarded from the U.S. Department of Education.

The purpose of this project is to identify the various problems that special education teachers meet in using microcomputers to teach handicapped students. A monograph will be prepared for special education teachers.

024 Black, R. S. (Project Director) (1983-1986). Introduction and utilization of CAI and related technological developments in the provision of instruction to handicapped pupils. (South Carolina Department of Education, Office of Programs for thje Handicapped, 1429 Senate Street, Columbia, South Carolina, 29201; (803) 758-7432) Grant awarded from the U.S. Department of Education.

The purpose of this project is to train special education administrators in developing plans and implementing CAI use in their districts and to transfer these skills to special education instructors. The training will include equipment familiarization, evaluation and use of

025

software, and applications of electronic communication in special education administrative and classroom settings.

025 Blackhurst, A. E. (1984). Computer Managed Instruction for Handicapped Students (No. 532). CEC/ERIC Computer Search Reprints, CEC Publications Sales, 1920 Association Drive, Reston, Virginia, 22091.

This computer search reprint consists of over 50 bibliographic abstracts on the above topic. The literature is derived from both the Exceptional Child Education Resources (ECER) and Educational Resources Information Center (ERIC) data bases. Each reference contains three sections: bibliographic information, indexing information, and an abstract of the document. The reprint can be purchased from CEC.

026 Blackhurst, A. E., & Hofmeister, A. M. (1979). Technology in special education. In L. Mann & D. A. Sabatino (Eds.), The Fourth Review of Special Education (pp. 119-228). New York: Grune-Stratton.

Reviews the applications of educational technology to the field of special education. The history and nature of the application of technology to special education is reviewed including a table presenting the major milestones in technology that have affected special education since 1808. Two approaches to the use of technology are stressed. The first is media technology including computer technology, telecommunication systems, and interface devices. The second application is in the area of systems technology including the instructional program, the instructional package, competency based teacher education, and technical assistance systems. Several barriers to the implementation and greater use of technology are listed.

027 Blashke, C. L. (1984). Technology trends in special education. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 1-22). Washington, D.C.: National Association of State Directors of Special Education.

Outlines microcomputer uses and trends including the changing needs in both instructional and administrative applications. Trends toward increased use of telecommunications are visible in the deaf community and more generally in the special education community through the use of electronic mail and bulletin boards. Evidence of a trend toward the use of interactive videodiscs is supported by the development efforts sponsored by the Department of Education. Major technology advances have occurred in the area of communication aids and devices including robotics.

028 Bowe, F. G. (1984). Personal computers and special needs. Berkeley, CA: SYBEX Computer Books.

This book provides examples of how handicapped people are using personal computers to overcome the limitations imposed by their disabilities. It illustratively describes equipment, hardware, and software available to people with limited vision, hearing impairments, mobility problems, and learning disabilities. Resource information is included.

029 Bowe, F. G. (1984). Micros and special education. Popular Computing, 3(13), 121-128.

The three technological developments described for persons with special needs are speech synthesis, speech-recognition, and keyboard modifications. In addition to presenting the names, manufacturers, and descriptions of 13 hardware and software products for these technologies, several resource organizations that evaluate computer learning tools for children with special needs are included, i.e., National Association of State Directors of Special Education (NASDSE); Network, Inc.; JWK International; LINC Resources, Inc.; and the Council for Exceptional Children (CEC).

030 Bracey, G. W. (1984). Issues and problems in devising a research agenda for special education and technology. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 32-42). Washington, D.C.: National Association of State Directors of Special Education.

Presents various theories of learning and concludes that our knowledge of how people learn is in a great state of flux. Testing measurements are in need of reform in order to more accurately reflect the learning through the new technologies. Stressed is the importance of research and development projects relating to the proposed effectiveness of computers. Recent findings confirm that there is: (1) more collaborative problem-solving by children using computers than by children in the traditional classroom setting; (2) effective instruction of low achieving students; and (3) a sense of control, through the use of computers, for some special education students.

031 Brady, R., & Dodge, B. (1982). Increasing productivity with microcomputers: Key to improvement of special education in the 1980s. Teacher Education and Special Education, 5(3), 30-35.

Described are five applications of microcomputers for improving the management and daily operation of teacher training programs. The five areas are data base management, word processing, spread sheets, project scheduling and management, and test scoring. A five-step approach to introducing microcomputers into a special education department is presented. These steps include: (1) appoint a departmental team to "window shop" for computers; (2) specify needs and expectations for the teacher education program and write corresponding objectives for proposed uses; (3) specify sources of data, staff inputs, and procedures that will produce the desired computer output; (4) engage a microcomputer consultant to advise in system selection; (5) test the system with a pilot study using simulated or real data and a borrowed system; and (6) plan out the

032

implementation process (e.g., anticipate impact and budget staff training time).

032 Brebner, A., Clark, L. M., & Johnson, K. (1984). Vocational training for developmentally handicapped adults using CAI. Computers & Education, 8(4), 445-448.

Discusses the use of computer assisted instruction (CAI) as a vehicle for training mentally handicapped adults. The vocational task of cafeteria cashiering is simulated through a multi-media computer terminal, random access slide projector, and duplicate cashier keyboard. The advantages of this design are repeated practice, continuous feedback, and appropriateness to group instruction. The authors conclude that the use of CAI is an efficient, cost effective method to assist handicapped persons in vocational training.

033 Brebner, A., & Hallworth, H. J. (1980, April). A multi-media CAI terminal based upon a microprocessor with applications for the handicapped. Paper presented at the annual convention of the Association for Educational Data Systems, St. Louis, Missouri.

This computer assisted instruction (CAI) interface is designed to provide appropriate instruction to the developmentally handicapped. The three main features are portability, reliability, and flexibility pertaining to the ease of adaptability to new input and output devices. The special features available to aid instruction for specific groups include double size characters, speech synthesis, random access slide projector, graphic characters, and animation. Input devices, which can be added, include items such as a touch sensitive display, light pen, and number pad.

034 Browning, P. (Project Director) (1983-1985). A new instructional technology to enhance transition from school to community for mildly handicapped individuals. (Rehabilitation Research and Training Center in Mental Retardation, University of Oregon, 206 Clinical Services Building, Eugene, Oregon, 97403; (503) 686-3585) Grant awarded from the U.S. Department of Education.

The purpose of this research project is to demonstrate the utility of computer assisted video instruction (CAVI) for teaching mildly handicapped adolescents and young adults important knowledge and skills in vocational, personal-social, and daily living areas. A manual on how to develop CAVI will be made available upon the completion of the project.

035 Browning, P. (Project Director) (1984-1986). Interactive video as an educational media approach to teaching handicapped high school students. (Rehabilitation Research and Training Center in Mental Retardation, University of Oregon, 206 Clinical Services Building, Eugene, Oregon, 97403; (503) 686-3585) Grant awarded from the U.S. Department of Education.

The goals of this two-year project include research, development, and dissemination of interactive video courseware which is designed to prepare handicapped adolescents for transition from school to the community. Interactive video, also referred to as computer assisted video instruction, is cited as being one of the many promising educational uses of microcomputers. The computer program provides for student interaction just as in CAI, but unlike a CAI program it also controls the playing of various video segments depending upon student inputs. The aim of this project is to develop an interactive video community-referenced curriculum for handicapped high school students.

036 Browning, P. (Project Director) (1984-1987). Simulation training as an instructional strategy for transition. (Rehabilitation Research and Training Center in Mental Retardation, University of Oregon, 206 Clinical Services Building, Eugene, Oregon, 97403; (503) 686-3585) Grant awarded from the U.S. Department of Education.

The purpose of this research project is to investigate the use of simulation training for preparing mildly handicapped high school students for transition from school to work and community. The four project goals are to: (1) assess the state of the art of simulation training; (2) develop a taxonomy of important community-referenced activities which can be effectively addressed through simulation training; (3) research the effectiveness of a technological approach to simulation training (i.e., interactive video); and (4) produce simulation training materials for practitioners and employ a set of strategies for their dissemination and utilization.

037 Browning, P., & Nave, G. (1983). Computer technology for the handicapped: A literature profile. The Computing Teacher, 10(6), 56-69.

A model is presented that describes computer applications in both education and rehabilitation including instruction, managerial, and functional uses. Various types of computer assisted instruction (CAI) programs have been developed for both students and teachers. Types of CAI include drill and practice, tutorial, simulation, and problem solving programs. Managerial uses have been implemented in both fields: education (IEP development, computer managed education, and record keeping) and rehabilitation (service delivery management systems). Computerized functional aids have also been developed to facilitate independent living and/or the communication of disabled persons. Literature resources that examine the application of computers in special education and rehabilitation are identified to increase professional awareness.

038 Browning, P. & Nave, G. (1984). Interactive video and the mentally handicapped: A research and demonstration program. In Proceedings of The Computer: Extension of the Human Mind III (pp. 90-101). Eugene, OR: University of Oregon, Center for Advanced Technology in Education.

Describes a research and demonstration program designed to explore the use of interactive video or computer assisted video instruction (CAVI) to teach mentally handicapped adolescents and young adults. This five year project is being conducted through the Rehabilitation Research and Training Center in Mental Retardation at the University of Oregon. The four project goals are to: (1) prepare a state of the art document on computer technology and the handicapped, (2) investigate the conditions under which mentally handicapped persons optimally learn through the use of interactive video, (3) develop community-referenced courseware for this target group, and (4) implement a dissemination/utilization plan for the project findings. The authors discuss both completed and ongoing activities with respect to each of these goals.

039 Brudner, H. J. (1982). Light on: Microcomputer, special education, and CMI. Educational Technology, 22(7), 25-26.

Suggests that computers be used to fulfill legal requirements to develop a specific curriculum, monitor progress with regard to predetermined learning objectives, and provide feedback to students and parents for each learning disabled student. Computer managed instruction (CMI) is cited as saving teacher preparation time by permitting the computer to take over time consuming tasks associated with individualization. The CMI developments mentioned include systems that construct an IEP and can test an entire class in reading and math.

040 Brunken, P. (1984). Independence for the visually handicapped through technology. Education of the Visually Handicapped, 15(4), 127-133.

Describes the computer lab and training program at the Nebraska School for the Visually Handicapped. The lab includes: (1) three Apple computers; (2) the Total Talk Computer Terminal; (3) two Echo II Synthetic Voice systems; (4) two VersaBraille systems, the IDS 460G Printer (???); (5) the Apple Letter Quality Printer; (6) the Cranmer Modified Perkins Brailler; (7) two Optacons; and (8) The Kurzweil Reading Machine. Students, ages 10-19, receive training on the various equipment and then use them for word processing, computer literacy, programming, and computer assisted instruction. Eight levels of utilization are cited.

041 Budoff, M. (Project Director) (1983-1984). An evaluation of the effectiveness of authoring languages for facilitating integration of microcomputers into special education. (Research Institute for Educational Problems, 29 Ware Street, Cambridge, Massachusetts, 02138; (617) 868-0360) Grant awarded from the U.S. Department of Education.

The purpose of this project is to evaluate the utility of "authoring languages" for special education teachers. The intent is to pursue the argument that authoring languages may permit teachers to become familiar with the technology and be productive in new ways of utilizing the microcomputers for instructional work with children in special education settings.

042 Budoff, M., Thormann, J., & Gras, A. (1984). Microcomputers in special education: An introduction to instructional applications. Cambridge, MA: Brookline Books.

Introduces special education teachers and administrators to the elements, origins, and logic of microcomputer systems, including a discussion of computer languages and software. Additionally, applications of microcomputers to the instructional process are outlined. The book includes a chapter which summarizes the findings of a statewide survey on how teachers in special education settings actually use microcomputers. Teachers talk about the distinctive role the microcomputer can and does play in their classrooms. Included among the applications in special education are (1) LOGO; (2) word processing to encourage writing, spelling, and language arts development; and (3) drill and practice programs and games for instilling mastery and problem solving skills. A chapter also is devoted to the topic of integrating computer assisted instruction into instructional scenarios or lesson plans. Finally, suggestions are offered on how to make the technolgoy work in schools.

043 Bull, G. L. (1983). Special training for special technology: A curriculum use of microcomputer-based tools in speech-language pathology. The Computing Teacher, 10(8), 52-56.

Discusses the ways in which computer technology is useful in speech and language therapy. Computer technology has been clinically applied in this field to treat or remediate language impairments, to augment communication of nonvocal disabled persons, and to analyze speech patterns of individuals with voice disorder. Clinical training has begun to incorporate instruction in microcomputer use and the rudiments of computer programming. A useful language for speech and/or language clinicians needs to be interactive, modular, and capable of controlling external devices (two appropriate programming languages are Forth and Logo). It is recommended that university training programs incorporate courses in programming and computer applications.

044 Bulletins on science technology for the handicapped. Projects on the Handicapped in Science. American Association for the Advancement of Science, Office of Opportunities in Science, 1515 Massachusetts, N.W., Washington, D.C., 20205.

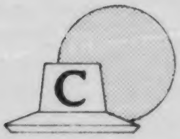
This is a free quarterly periodical published by the American Association for the Advancement of Science, with the assistance of a special grant from the National Science Foundation. It is an outgrowth of the Project on the Handicapped in Science (PHS). Bulletins report on workshops conducted by PHS, current research, potential funding sources for research and development, and resource lists for additional information for consumers of technology for the handicapped.

045 Burrello, L. C., Tracy, M. L., & Glassman, E. J. (1983). A national status report on the use of electronic technology in special education management. The *Journal of Special Education*, *17*(3), 341-353.

This research study, commissioned by the Council of Administrators of Special Education (CASE), examined how local administrators use computer technology to handle paperwork, meet governmental reporting requirements, and track student progress. The sample included the 3,600 members of CASE. A discussion of the results presents two competing perspectives on computer application to special education management: (1) most special education administrators are using management-information-systems to increase staff efficiency in meeting input and output demands; develop standard frameworks of operation; automate wherever possible to reduce work, manpower, cost, and turnaround time; and (2) an alternate decision support system which utilizes computer technology to support, not replace, managerial judgement; and make decision-making more effective rather than merely more efficient. A discussion of the types of decision support systems that relate to generic operations managers perform follows. Also included is a discussion of a framework for future development of microcomputer technology including: (1) task analysis of the administrator's work, (2) the decision perspective taken for the task, and (3) the information characteristics needed. The implications of this framework for special education administrators are presented.

046 Bushon, S. (1983). Microcomputer management in rural special education. *Rural Special Education Quarterly*, *4*(4), 5-6.

Discusses the development of a computer-managed instructional system developed by the North Slope Borough District Special Education Department in Alaska. The system chosen is based on the software program "SuperPlanner." It is designed to organize instructional objective planning, assist in developing IEPs, and generate the necessary reports to meet the requirements of P.L. 94-142. The system is also used to monitor student and family information and to track and record student progress. The school district currently has electronic mail service to special education teachers in each village. Future plans are being made to develop a networking of computers capable of exchanging data and updating student files at each site.



047 Cain, E. J., Jr. (1984). The challenge of technology: Educating the exceptional child for the world of tomorrow. Teaching Exceptional Children, 16(4), 239-241.

Addresses five categories of current applications of electronic technology. The application areas are communications, problem-solving, prosthetic devices, recreation, and vocational preparation. The computer is described as the only instructional media which is truly interactive and that allows the handicapped user complete control of the learning process. Using computer instruction management enhances the teacher's decision-making process. Furthermore, computer test-scoring programs permit criterion-referenced analysis of student's scores on both ability and achievement testing instruments.

048 Cain, E. J., Jr. (1984). The role of the computer in special education: Some philosophical considerations. The Pointer, 28(2), 6-11.

Addresses the issue of why computer technology should be incorporated into special education programs in spite of the demands that technology places on teacher training, monetary resources, and instructional retooling. The reasons for using computers in special education are: (1) they are being increasingly used in regular education programs; (2) they assist the handicapped in reaching their maximum potential and prepare them for the most productive life possible; (3) they serve as a valuable compensatory expressive and receptive language tool that leaves the individual in complete control of the communication process; (4) they provide handicapped learners with opportunities to practice learned concepts in the "real world" through simulation and problem-solving that involve interaction and creativity; (5) they serve as a prosthetic communication device for dyslexics, the deaf, the hard of hearing, the sight-impaired, and the language-disordered; and (6) they can provide a recreational alternative that allows disabled persons to "play" soccer, ping-pong, and a variety of other active sports, as well as social interactive recreation through communciations networking.

049 Caldwell, D. C. (1981). Closed-captioned television and the hearing impaired. Volta Review, 83(5), 285-289.

Reviews the history of closed captioning, a process in which television dialogue is translated into subtitles, converted to electronic code, and inserted into the regular television broadcast signal in a portion of the screen not normally seen. Televisions must be equipped with special decoders, which are available as adapters or integrated receivers. The National Captioning Institute (NCI) offers a captioning service which has experienced steady growth. It has been recognized that captions can remediate communications problems faced by hearing impaired learners, including reading, writing, vocabulary building, semantic understanding, grammar, and overall linguistic competence. Areas of development for closed captioning include: (1) closed caption films as well as videotape; (2) second language captioning; (3) real-time captioning of live events; (4) a full-screen "printed radio;" and (5) compatibility with television broadcasting formats and equipment, such as teletext systems, used in other countries.

050 Campbell, B. (Project Director) (1983-1985). Technology compensatory activities: Severely physically-impaired persons. (Prentke Romich Company, 8769 Twp. Road 513, Shreve, Ohio, 44676; (216) 567-2906) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop an expressive communication aid that also provides for mobility control and computer access. The entire unit will consist of a motorized wheelchair with a core component mounted on it. The student will be able to select between controlling the wheelchair, speech synthesis, and wireless computer data transmission.

051 Campbell, B., Gibbs, L., & Snodgrass, G. (1982). Telecommunications: Information systems for special education's future. Journal of Special Education Technology, 5(1), 1-11.

The applications of computer-assisted telecommunication systems are discussed. The systems provide users with an interactive medium using the following forms of communication: (1) voice (audio-teleconferencing); (2) text (telewriting, telecopying, and electronic mail); and (3) visual (slow-scan video, interactive cable television, video) teleconferencing. The use of and rationale for a computer-assisted Telecommunications Network are presented. SpecialNet, a communication network created by National Association of State Directors of Special Education (NASDSE) is described. Further information about SpecialNet is available from NASDSE, 1201 16th Street, N.W., Suite 404E, Washington, D.C., 20036; (202) 822-7933.

052 Candler, A. C., & Johnson, D. L. (1984). Software for teaching math in special education. Academic Therapy, 19(4), 487-492.

Discusses special considerations in selecting software for handicapped learners in special education. The authors also present a number of examples of math software for special students. Included in this listing of existing math software is: (1) Arithmetic Classroom, which is produced by Sterling Swift Publishing Company; (2) Bingo Math for Color Computer, distributed by Radio Shack; (3) Ruler-Inches, available from Microcomputers in Education from Minneapolis, Minnesota; and (4) The Basic Living Skills Programs, produced by MCE, Inc., in Kalamazoo, Michigan.

053 Candler, A. C., & Johnson, D. L. (1984). Software for teaching reading in special education. Academic Therapy, 19(5), 607-612.

Reviews and evaluates four programs chosen to reflect the range of software available in special education reading instruction. The evaluation is based on instructional content, presentation format, degree of comprehensiveness, and cost and hardware requirements. The first program, Compu-Read 3.0 by Edu-Ware Services (available for Apple and Atari) is an example of general education materials with special education applications. Four modules (letters, words, synonyms and antonyms, and sentences) are designed to build reading comprehension and word recognition. The second program, Critical Reading Lesson Series A-H, by Borg-Warner Educational Systems, is available for both the Apple II and TRS-80. It includes eight programs, a management system, and a teacher's guide. Furthermore, it introduces students to logic and reasoning skills that build reading comprehension beginning at the third grade. A third program is Reading Comprehension: What's Different, by Program Design, Inc., (available for Apple II and Atari). This program uses second through sixth grade reading levels to teach classification skills. The fourth program is Comprehension Power by the Milliken Publishing Company. The stories are presented in three phases, which are an introduction to vocabulary, key sentences, and story. The stories can be viewed one line at a time at a pre-set pace or by line groups at the reader's pace.

054 Cardinal, D. N., & Weiner, L. I. (1984). Microcomputing. Learning Disability Quarterly, 7(1), 113-120.

Lists three original programs designed to be easily modified for use in the LD classroom. The three programs listed are Homophones, Confusable Words, and Science. The subject content of each program can be modified (e.g., expanded) and will run on TRS 80 and Apple computers. The authors suggest using such programs to introduce computer generated learning experiences into the classroom.

055 Carter, J. W. (1984). Feedback effectiveness via computer assisted video instruction on the learning performance of mentally handicapped adolescents. Unpublished doctoral dissertation, University of Oregon.

The purpose of this study was to examine the effects of feedback in educational software on the learning performance of secondary aged mentally handicapped students. A computer assisted video lesson was prepared to teach items related to budgeting. Subjects used the computer to enter yes/no responses to stimulus questions. The type or content of feedback given was the independent variable. Thirteen experimental subjects received extensive visual and auditory corrective feedback following incorrect responses. The 13 control subjects received error corrective but briefer and less informative feedback. Subjects were evenly distributed between groups based on pretest measures and IQs. Examined was the differential effectiveness of six dependent variables: (1) errors during treatment, (2) a treatment score, (3) an adjusted treatment score, (4) a response latency measure, (5) a 24-hour retention test total score, and (6) a 24-hour retention test partial score. The results indicate no differential feedback effects between the two groups; however, both groups did significantly improve performance on the learning task as measured by the items responded to correctly during the CAVI lesson.

056 Carter, J. W. (1984). Learning characteristics of retarded persons as criteria for evaluating special education software. *SIG Bulletin, 1*(2), 4-9. (International Council for Computers in Education, 1787 Agate Street, Eugene, Oregon, 97403)

Discusses how computer assisted instruction (CAI) can be designed to teach to the specific learning characteristics of retarded persons. The six learning characteristics are: (1) selective/poor attention to relevant stimuli, (2) reading/visual discrimination difficulty, (3) inappropriate response timing, (4) short-term memory deficits, (5) transfer/generalization problems, and (6) inability to recognize mistakes. The article emphasizes that special learning needs must be considered by both special education software developers and by special educators when selecting programs for their retarded students. Specifically, the author contends that when developing or selecting software for the mentally handicapped, an evaluation should be completed with respect to the previously mentioned learning characteristics. As an example, three tutorial software products are presented and evaluated in terms of their suitability for these special learners.

057 Carter, J., Browning, P., Nave, G., & White, W. A. T. (in press). Interactive video as a learning medium for mentally handicapped adolescents. *Journal of Special Education Technology*.

Reports the findings of a study designed to determine if (1) interactive video is an effective instructional medium with mildly handicapped adolescents, and (2) learning performance is affected by the type of informational feedback given to the learner. Twenty-six subjects were assigned to two groups which were equated on a pretest score and IQ. Mean IQs were 58 and 60. Subjects were required to use the "Y" and "N" keys on the keyboard to respond to 10 true/false items about budgeting. Stop criteria for each item was two consecutive correct responses or a total of three incorrect responses. Significant learning occurred for both groups indicating that interactive video is an effective medium. There were no differences, however, between the student who received the more extended versus briefer form of informational feedback.

058 Cartwright, G. P. (1984). Computer applications in special education. In D. F. Walker & R. D. Hess (Eds.), *Instructional software principles and perspectives for design and use* (pp. 166-180). Belmont, CA: Wadsworth.

Outlines principles of good instructional design for direct computer applications with the handicapped. The principles included are: (1) variations in design for specific disabilities, (2) stimulus and response modalities as well as cognitive capabilities, (3) modifications in rate and levels of instructional programs for the mildly handicapped, and (4) access to hardware for those with physical or sensory problems. Direct applications of computers are listed for the mildly handicapped, emotionally disturbed, severely handicapped, hearing impaired, visually impaired, physically limited, and speech handicapped. Indirect applications for the computer being used on behalf of, rather than directly by, the handicapped student include computer managed instruction, behavioral scheduling, and telecommunications.

059 Caruso, D. (1984). Micros break silence for deaf editor. InfoWorld, 6(12), 33.

Henry Kisor, a deaf editor of books and computer columnist for the Chicago Sun-Times, reports how computers have helped him "reach out and touch someone." He sees computer bulletin boards as a way for the deaf to have more human interaction. Even though he personally subscribes to between 45 and 50 telecommunication services and bulletin boards, he also recognizes their prohibitive factors: (1) cost, (2) the problems of the TDD (Telecommunications Devices for the Deaf) telephone system, and (3) the majority of the deaf community lacks confidence with either spoken or written language because they are born deaf.

060 Castle, D. L. (1981). Telecommunication and the hearing-impaired. Volta Review, 83(5), 275-284.

Reviews the content of two communication training courses offered at the National Technical Institute for the Deaf, Rochester, New York. The courses teach about telecommunication aids and devices available to the hearing impaired including: (1) hearing aids, telephone amplifiers, and adapters; (2) Telecommunication Devices for the Deaf (TDDs); (3) an electronic handwriter, which does not require typing skills; (4) telephone devices for the deaf-blind, including the Code-Com and the Braille-Teletypewriter; (5) telephone coding systems, including speech codes, non-speech codes, and speech indicator; and (6) radio paging equipment. Consumer tips regarding advantages, disadvantages, areas of controversy, purchasing considerations for telecoils, amplifiers, adapters, and TDDs are included.

061 Catalyst (Newsletter). Western Center for Microcomputers in Special Education, 1259 El Camino Real, Suite 275, Menlo Park, California, 94025.

This bi-monthly newsletter is specifically intended to assist special educators and related professionals with computer assisted instruction (CAI) for disabled people. The purpose of the newsletter is to disseminate information about recent research, hardware and software development, and applications of computers in special education. The Catalyst is available for $20.00 to institutions and $12.00 to individuals.

062 Center for Special Education Technology Information Exchange. The Council for Exceptional Children, 1920 Association Drive, Reston, Virginia, 22091.

The Center for Special Education Technology Information Exchange focuses on the needs of special educators, administrators, and parents for systematic planning, selection, and use of technology in order to improve the quality of instruction for handicapped children. The Center maintains an information base and conducts symposiums on research and development. The information resources at the Center are accessible via phone, mail, electronic networks, and a telephone hotline and taped message system. The Center is funded by the U.S. Department of Education and is operated in conjunction with LINC Resources, Inc. and JWK International Corporation. There is no charge for information requested.

063 Chandler, H. N. (1983). If we're really on our way, shouldn't we buy a roadmap? Journal of Learning Disabilities, 16(1), 54-56.

Provides discussion of the decisions to be made relative to how and why computers should be used in American education. The main points concern what sorts of software are being used and how effective they are and whether or not schools are going beyond teaching entry-level computer skills for students entering the job market or college programming classes.

064 Chapman, R. S., & Miller, J. F. (Project Directors) (1980-1984). Microprocessor testing and teaching of verb meaning. (Wisconsin Research and Development, Center for Individualized Schooling, 1025 West Johnson Street, Madison, Wisconsin, 53706; (608) 263-4200) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a microcomputer program for the testing and teaching of verb meaning in both language production and comprehension. The target audience includes developmentally disabled, physically handicapped, and language disordered children who are 2 to 4 years in either chronological age or functional level.

065 Chiang, B., Thorpe, H., & Lubke, M. (1984). LD students tackle the Logo language: Strategies and implications. Journal of Learning Disabilities, 17(5), 303-304.

Discusses instructional and management aspects of a project in which 13 learning disabled and 10 nondisabled 4th and 5th grade students learned Logo computer language using Texas Instrument microcomputers.

066 Chin, K. (1983). Head movements, microprocessor steer wheelchair. InfoWorld, 5(30), 13-14.

Reports the use of a computerized wheelchair control mechanism based on a Z80 based microcomputer and two polaroid sonar sensing devices. The devices, which are placed on each side of the headrest, detect the slightest tilt of the head and allow the user to manipulate the direction and movement of the wheelchair with greater control.

067 Chin, K. (1983). AVOS aids to the visually impaired. InfoWorld, 5(34), 1.

Reports the uses of the Audio-Visual Operative System (AVOS) for the visually impaired. The AVOS system uses a voice synthesizer which allows the visually impaired person to perform a variety of computer applications. According to the author, visually impaired persons would be able to perform clerical tasks and expand employment opportunities with the aid of this system.

068 Chin, K. (1983). Lack of funds slows rehabilitative-robots research. InfoWorld, 5(43), 26-29.

Presents the current state of robotic products for the physically, mentally, and visually impaired. Current developments include the refinement of the robotic arm which can be controlled through a sensory head device, recognition commands, chin control units, and pressure on a mouth held palatial splint. At present, the cost of such aids prohibit their use on a wide scale. Unfortunately, the development of a specific robotic aid to suit a specific handicapping need increases the cost even further. The market for robotic products designed for the handicapped has yet to be clearly defined and is without a guarantee of profitable return. Most manufacturers are hesitant at this point to invest in such production.

069 Ciarcia, S. (1983). Build the H-Com handicapped communicator. BYTE, 8(11), 36-50.

Provides a description of and instructions for building the H-COM scanning communicator. The H-Com is a keyboard simulator that can be used to send text directly to a printer or to a text-to-speech synthesizer. Using the serial-output commands and phrase mode, the H-Com can transmit words and sentences from a prestored vocabulary. The H-Com is designed to operate as a normal keyboard using only one key. The H-Com's six transmission modes include all-caps, one cap, lowercase, control characters, phrase, and local. Also discussed is H-Com hardware and software.

070 Closing the Gap (Newsletter). P.O. Box 68, Henderson, Minnesota, 56044.

Closing the Gap is a newsletter which pertains exclusively to microcomputers for the handicapped. The primary objectives of the publication are to: (1) update the reader on the latest results of research and development programs pertaining to handicapped persons, and (2) provide information necessary to acquire this material. Subscriptions are $18.00 for one year (six issues).

071 Cohen, S. B., & Schwartz, T. A. (1983). The use of microcomputers in teacher training. Journal of Learning Disabilities, 16(5), 300-302.

Proposes that microcomputers be used to teach special education teachers instructional skills, such as task analysis, IEP development, and questioning. It is suggested that teacher training in computer literacy be approached from an applications point of view (i.e., to be able to select hardware and software that will address needs of individual students). Training at this level will help alleviate some problems teachers face in using computers: (1) teacher intimidation regarding the hardware, (2) teacher failure to facilitate computer learning experience by students, and (3) poor training of teacher computer skills. A plan for training teachers that involves thorough integration of computer use into preservice training is discussed.

072 Colbourn, M. (1984). Expert systems: Their potential roles within education. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 79-91). Washington DC: National Association of State Directors of Special Education.

Defines the specific area of Artificial Intelligence (AI) known as "expert systems" as an automated consulting system designed to provide the user with expert advice within a particular subject area. It applies the knowledge encoded in its software to aid or advise the user. Brief descriptions presented of expert systems or Intelligent Computer Assisted Instruction (ICAI) developed for teaching or tutoring in education are: (1) SOPHIE (SOPHisticated Instructional Environment), about electronics troubleshooting; (2) SCHOLAR, about South American geography; (3) WHY, about physical properties; and (4) WEST and WUSOR, about game playing. In addition, BUGGY, an expert system used for educational diagnosis of a child's arithmetic skills, is described.

073 Colbourn, M., & McLeod, J. (1983). Computer guided educational diagnosis: A prototype expert system. Journal of Special Education Technology, 6(1), 30-39.

Reviews recent literature pertaining to the development and uses of "expert" systems (i.e., software programs that include information designed to guide the user). The authors describe the McLeod Educational Diagnosis Model, which was selected as a frame of reference prior to developing an expert system to assist in the assessment of reading problems. The mode consists of four stages of diagnosis: (1) retrospective, (2) definitive, (3) analytic, and (4) prescriptive. The model does not specify the exact information to be gathered in assessments nor the specific information-gathering methods. The computerized expert system based on this model is a production system consisting of three components: (1) a global data base containing all relevant information pertaining to the child being assessed; (2) production rules, which represent the expert knowledge resource programmed into the guidance function of the program; and (3) the control structure, which is responsible for coordinating the entire diagnostic process.

074 Communication Aids in Special Education (1983). Education Turnkey Systems, Inc., 256 North Washington Street, Falls Church, Virginia 22046.

Assesses the current state of new technologies providing communication aids for the handicapped. It is one of four reports published by Education Turnkey, funded by Special Education Programs, U.S. Department of Education. Explained are access technologies for various disabled populations and the reluctance of private firms to develop aids due to the small market. Also noted are individuals and organizations developing aids with federal funds. Devices described to aid communication for the partially sighted, blind, hearing impaired, and nonvocal physically limited are: (1) high powered lenses, (2) television cameras and systems, (3) readers, (4) recordings, (5) Braille systems, (6) speech interpretation, (7) voice recognition components, and (8) special menus on the computer display. Six organizations are listed which make communication devices. The factors discussed that will affect use of communication aids are the need for information about availability, the need for staff training in local schools, and the need for creative funding sources.

075 Communication Outlook (Newsletter). Artificial Language Laboratory. Computer Science Department, Michigan State University, East Lansing, Michigan, 48824.

Communication Outlook is an international publication pertaining to the application of techniques and aids for persons who experience communication handicaps due to neurological or neuromuscular conditions. This periodical is edited and published jointly by the Artificial Language Laboratory at Michigan State University and the Trace Center for the Severely Communicatively Handicapped at the University of Wisconsin at Madison. Annual subscriptions are $12.00 for four issues.

076 Computer Assisted Instruction for Handicapped Children and Youth (No. 506). CEC/ERIC Computer Search Reprints, CEC Publications Sales, 1920 Association Drive, Reston, Virginia, 22091.

This computer search printout consists of over 100 bibliographic abstracts on the above topic. The literature is derived from both the Exceptional Child Education Resources (ECER) and Educational Resources Information Center (ERIC) data bases. Each reference contains three sections which are: bibliographic information, indexing information, and an abstract of the document. This printout can be purchased from CEC.

077 Computer Assisted Instruction for Handicapped Individuals. Programs for the Handicapped (May/June 1982, No. 3, pp. 5-8). Clearinghouse on the Handicapped, Office of Information and Resources for the Handicapped, Room 3119, Switzer Building, Washington, D.C., 20202.

Briefly addresses computer assisted instruction (CAI) within the context of hardware and software barriers for disabled individuals. In addition, the following resources pertaining to computers for the handicapped are discussed: (1) The Trace Research and Development Center for the Severely Communicatively Handicapped, which among other things, provides a registry of microcomputer software for the handicapped; (2) The Northwest Regional Education Laboratory's Microsift Project, which provides a bibliographic retrieval service concerning the use of computers in education; (3) Vital Information, which is a national clearinghouse for information on microcomputer software; and (4) Closing the Gap and Catalyst, both of which are bi-monthly newsletters on how computers can assist handicapped individuals.

078 Computer Assisted Rehabilitation Service Delivery (1982). Eighth Institute on Rehabilitation Issues. West Virginia Research and Training Center, Administration, Training and Publications Staff, One Dunbar Plaza, Suite E, Dunbar, West Virginia, 25064.

Reviews the current and potential applications of computers and related technology to the rehabilitation system. The stated objectives for the conference manuscript were to: (1) identify and describe the major ways computers are being used to assist service delivery in state vocational rehabilitation (VR) agencies, (2) identify and describe uses of computers which have potential for adaptation to VR service delivery needs, (3) describe a VR office as it could exist today if computers were optimally used, (4) describe in basic terms the major elements of computer systems, (5) present guidelines for planning the development of new or expanded computer systems within VR agencies, and (6) discuss the problems and fears associated with computers.

079 Computer-Disability News (Newsletter). National Easter Seal Society, 2023 West Ogden Avenue, Chicago, Illinois, 60612.

This quarterly newsletter is published as an educational service by the National Easter Seal Society to provide computer resource information to people with disabilities. It describes specific software programs, lists conferences and events, and reviews books on computer technology and disabled individuals. It is available for no charge from the above address.

080 Computer equity (1984). The Computing Teacher (Special Issue), 11(8).

The focus of this special issue is on access equity regardless of sex, economics, or handicapping condition. Articles address computer access for the visually impaired and the physically limited.

081 Computer technology (1984). The Exceptional Parent (Special Issue), 14(4).

This special issue includes articles titled: (1) "Communication Devices and an Enriched Life - An Autobiography," (2) "Logo is for All Children - Learning with the Turtle," (3) "Use of Microprocessors to Initiate Language Use in Young Nonoral Children," and (4) "Microcomputer Activities and Occupational Therapy." A book review of Computers, Education, and Special Needs is also included.

082 Computers - The future is here (1983). The Exceptional Parent (Special Issue), 13(3).

This special issue includes an explanation of computers and computer terms, information about Michigan's PAM assistance center and the ABLEDATA System. Also included are articles on computers and children with special needs, communication through technology, and using technology to break the silence barrier.

083 Computing and the handicapped (1981). Computer (Special Issue), 14(1).

This special issue contains nine articles, the titles of which are: (1) "Computing and the Handicapped: Guest Editor's Introduction," (2) "Computing and the Handicapped: A Promising Alliance," (3) "Computing and the Handicapped: The Challenge in Education," (4) "Intelligent Prosthetic Devices," (5) "Communication devices for the NonVocal Disabled," (6) "The Impact of Microcomputers on Devices to Aid the Handicapped," (7) "A Computer-Aided Robotic Arm/Worktable System for the High Level Quadriplegic," (8) "Rehabilitation and the Handicapped Programmer," and (9) "Practical Application of Microcomputers to Aid the Handicapped."

084 Computing and the handicapped (1984). Educational Computer (Special Issue), 4(1).

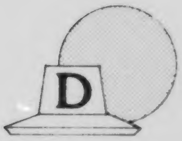
Feature articles in this special issue include: (1) "Business Information Processing Education for the Disabled," (2) "Micros and Multiply Handicapped Children: Flights and Fancy," (3) "A Time for Action: American Schools and the Adaptation of Computer Technology," (4) "Computing and Handicapped Education," (5) "The micro in the Chemistry Lab: An Aid to the Visually Impaired," (6) "Using Microcomputers with Learning Disabled: Will the Potential be Realized?," (7) "Logo Helps Remove Childrens' Handicaps," and (8) "A Brief History of Videodisc."

085 COPH Bulletin. Committee on Personal Computers and the Handicapped, 2030 Irving Park Road, Chicago, Illinois, 60618.

COPH Bulletin and Link and Go are official publications of the Committee on Personal Computers and the Handicapped (COPH-2), which is a self-help organization intended to enable persons with disabilities to use the same computer technologies as the public-at-large. Specifically, the purpose of COPH-2 is to search out, evaluate, and share personal computer information which is deemed relevant to persons with disabilities. Membership dues are $8.00 a year and include subscriptions to both newsletters which cover such topics as: (1) what kinds of computer hardware and software may be used by persons with disabilities; (2) how the computer may be used by persons with disabilities for school, work, or play; (3) how software has been adapted to the conditions of some disabled individuals such as a computer dictionary to generate text; (4) how children with disabilities can use computers as an integral part of their personal development; and (5) how to locate educational materials that were developed with disabled individuals in mind.

086 Cote, A. J., Jr. (1983). Speech images in the IBM PC. *BYTE*, *8*(11), 402-407.

Describes an experimental speech-input card that will permit an IBM PC to plot an image of vowel sounds. A functional description of the speech-interface card and the acquisition/transformation software is included. The system is designed to reveal phonemes (meaningful sounds) in speech. Possible applications include auditory prostheses and continuous speech-recognition for the hearing impaired.



087 Davis, N. C. (1983). Yes they can! Computer literacy for special education students. *The Computing Teacher*, *10*(6), 64-67.

Presents a description of and curriculum outline for a computer literacy and programming course taught to seventh grade special education students. The school board policy specified that all seventh graders were to be taught an introductory class in computer literacy. Special education students were excluded from this mandate; however, one teacher took the responsibility of structuring a course for them. This article presents a description and curriculum outline for the 15-day course. The experiences of these students are described and lesson plans for each day of the class are presented.

088 Davis, N. C. (1984). Computer literacy for the special student: A personal experience. *Teaching Exceptional Children*, *16*(4), 263-265.

A group of 10 educable mentally retarded students in middle school took a computer literacy course from an instructor that was not trained in special education. The students were taught basic programming skills including five commands and graphics on Commodore PET computers and introduced to Kidstuff, the PET version of LOGO. Due to the success of this experience, these and other special education students have enrolled in subsequent computer courses.

089 Day, R., Gum, W., & DeGrasse, W. (1982). Implications of the IBM Audio Typing Unit for blind word processors. Journal of Visual Impairment and Blindness, 76(10), 407-411.

Reviews the Audio Typing Unit designed by IBM to aid visually impaired typists to revise and review final copy without help from sighted co-workers. The criteria for review include (1) ability of unit to aid user in proofreading and correction, (2) user satisfaction, (3) quality of synthetic speech, (4) time required for user to feel comfortable with unit, (5) number of typing errors made by user over time, and (6) degree of self-sufficiency shown by user. The unit monitors a host typewriter and audibly supplies characters, words, or sentences.

090 Dobbins, D. A., & Bickel, S. J. (1982). How the hardware can help. Special Education: Forward Trends, 9(4), 25-26.

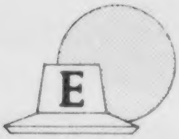
The suitability of certain hardware to help children with special needs is discussed. Some of the hardware presented includes: (1) Versa Braille, (2) reprogrammable keyboards used to overcome movement deficiencies, (3) sophisticated keyboards designed to assist different handicaps, (4) machine-controllable auditory link, (5) Carroll Light Interrupt Touch Panel, and (6) the touch sensitive screen. The touch sensitive screen is presented as the most important peripheral device for assisting children with learning difficulties in using computers. PLATO is a system which allows auditory presentation of instructions, feedback, and response through a touch sensitive screen. Short-term memory, spatial awareness, and selective visual and auditory sequencing are abilities tested with PLATO. Simulation is also mentioned as one of the best ways that microelectronics can help special students.

091 Dominguez, J., & Waldstein, A. (Eds.) (1982). Educational Applications of Electronic Technology. Monmouth, OR: Western States Technical Assistance Resource (WESTAR).

The four chapters in this book are entitled: (1) "Computer Systems for Special Educators," (2) "Educational Software: In Search of Quality," (3) "Communication/Information Systems for Special Education," and (4) "Cable Television: A Medium for Extending and Improving Education." Throughout the chapters, the reader is presented with important aspects of each subject including history, advantages and limitations, cost data, availability of materials, future directions, decision-making criteria, and the opportunities that the newness of the field presents.

092 Doorlag, D. M., & Doorlag, D. H. (1983). Cassette braille: A new communication tool for blind people. Journal of Visual Impairment & Blindness, 77(4), 158-161.

Presents the instructional use of the VersaBraille Computer in the San Diego Unified School District in California. The VersaBraille is a cassette, or paperless, brailler. Implementing the use of the VersaBraille includes: (1) instructing teachers in its use, (2) establishing appropriate goals for the project, and (3) developing tests to assess student abilities. Comparisons of cassette and paperbraille in writing and reading are provided, as is a discussion of classroom applicability and materials preparation. Despite several problems, such as confining the user to communicating with another VersaBraille, users were found to be generally positive in its use and in test results.



093 Eagan, A., & Wilson, M. A. (1984). Word processing with students: What does the teacher need to know? The Pointer, 28(2), 27-31.

Discusses potential uses and problems of word processing in both general and special education. The prerequisite skills for teachers are computer competency, sufficient training to control learning environmnet, fundamental understanding of programming and language, and hands-on experience with equipment to be used. The authors describe procedures for orienting students to computer use and word processing, and discuss problems and potential in the following areas: (1) typing skills, (2) spelling, (3) remembering commands and using them accurately, (4) managing the classroom, and (5) writing activities with the word processor.

094 Educational technology for the 80s (1979). American Annals of the Deaf (Special Issue), 124(5).

This special issue contains nine articles which relate specifically to the use of computers to serve the deaf and hearing impaired. The titles of these articles are: (1) "A System for the Synchronization of Continuous Speech with Printed Text," (2) "The DAVID System: The Development of an Interactive Video System at the National Technical Institute for the Deaf," (3) "A Pilot Experiment in Computer Assisted Speechreading Instruction Utilizing the Data Analysis Video Interactive Device (DAVID)," (4) "Media Based Interactive Visual Image Controlled (Vis-I-Con) Instructional Delivery System for Instruction of Deaf and Hearing Impaired," (5) "Computer-Assisted Instruction at the California School for the Deaf - Past, Present, and Future: An Administrator's View," (6) "Computer Supported Braille Applications," (7) "The Utilizaiton of the Computer with the Hearing Impaired and the Handicapped," (8) "Interfacing an Inexpensive Home Computer to the Videodisc: Educational Applications for the Hearing

Impaired," and (9) "Illustrating Language through Computer Generated Animation."

095 England, G. D. (1979). *A study of computer assisted budgeting among the developmentally handicapped*. Unpublished doctoral disseration, University of Calgary.

This study was designed to investigate the effectiveness of teaching complex budgeting skills through computer assisted instruction (CAI) to developmentally handicapped persons. Two groups of young adults were selected for participation. The subjects in Group 1 were living semi-independently and holding jobs, while the subjects in Group 2 were trainees at a Vocational Training Center. The CAI program consisted of a fictitious character with a pre-established salary. The students were to practice budgeting the salary into eight categories (e.g., food, utilities, etc). The computer lesson was interfaced with a carousel slide projector which projected pictures of possible budget items and purchase prices. Corrective feedback was provided for purchases that were under or over a specified percentage amount. Results indicate that (1) the computer was a viable tool for teaching budgeting to these persons, (2) the CAI program led to performance changes in both groups, and (3) generalization did not appear to occur with Group 1 subjects.

096 Evans, R. O., & Sherrill, T. (1983). A computer program to assist persons with physical or visual impairments in notetaking. *Rehabilitation Literature*, *44*(11-12), 331.

Presents a 10-statement program (in BASIC) which provides a template for entering and storing lines without developing a file or using commercial software. The program is particularly helpful if note taking is a problem, as input can be translated directly into voice or braille with use of a home computer. Copying from within the program to disc or tape requires creation of a file. Additional programming is then necessary to read the file.

097 Evans, W., & Stritch, T. (1983). The video-game syndrome. *Academic Therapy*, *18*(5), 533-534.

Introduces reasons why indiscriminate use of computers could hinder learning disabled students in the classroom. Learning disabled (LD) students with visual deficits may have problems with visual discrimination or memory which might be aggravated by the use of "electronic worksheets." LD students with fine motor skills deficits may get less opportunity to practice their writing. LD students with auditory deficits are unlikely to be remedied by the often silent machine. Finally, educational software which requires previously learned skills may be inappropriate for LD students who have not mastered basic reading and math skills.

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098 Faulkner, M. C. (1982). A study of the effectiveness of computer assisted instruction for teaching time-telling skills and time-related concepts to developmentally handicapped adults. Unpublished doctoral dissertation, University of Calgary.

Presents a two-phase research project investigating the (1) effectiveness of a computer assisted instruction (CAI) program to teach developmentally disabled adults to tell time, and (2) effectiveness of CAI to teach these learned time concepts relative to work. Thirty-six subjects participated in the first phase of the study, which used tutorial and drill and practice CAI to teach time-telling to the hour and the half hour. Nineteen of the original 36 subjects were selected for phase 2 participation. These subjects were assigned to two groups. The experimental subjects (n = 10) received CAI instruction on three temporal concepts: early, on time, late. The remaining subjects (n = 9) were assigned to a no treatment control group. Results indicate that both CAI programs were effective in achieving the purpose for which they were developed. Specifically, there was a statistically significant improvement in ability to tell time as a result of the first phase of the CAI program. Additionally, there were statistically significant differences between groups in the second phase (i.e., the experimental group performed better than the control group).

099 Fay, G., Okamoto, G., Brebner, J., & Winter, F. (1982). The electronic schoolhouse: New technology in education of the severely retarded. Pointer, 26(2), 10-12.

Discusses the use of microcomputer technology with severely physically disabled children. Microcomputers, electronics, and bioengineering are used in the rehabilitation of these children with impaired musculoskeletal systems. This article describes three areas of technological intervention. These three areas are: (1) microcomputer assisted assessment of cognitive competence and brain functioning, (2) nonvocal communication with the aid of the Handicapped Typewriter developed by Rocky Mountain Software in British Columbia, and (3) information prosthetics as a revolutionary concept in the computer education of the handicapped. The Logo project at MIT has demonstrated that technology can be used to create teaching/learning environments that allow a physically immobile child to participate in activities similar to those of their normal peers.

100 Feddern, B. (1984). Microcomputers in speech education--A success story. The Computing Teacher, 12(2), 58-59.

Describes the success of one teacher to increase the academic and social skills of six special education students through the use of computer assisted instruction. The author reports that along with academic and social gains came increased motivation and self esteem.

101 Fiday, D. (1983). CAI at Laraway for students with learning disabilities. The Computing Teacher, 10(6), 32.

Describes the advantages of a program incorporating the use of computers for learning disabled and emotionally handicapped students. This program is defined as a philosophy and strategy for teaching special students. Computer assisted instruction (CAI) is beneficial because it demands analytical and critical thinking from its users. Thus, interacting with CAI generates growth in skills and, concomittently, growth in self-esteem. It is recommended that CAI require students to think beyond normal remedial expectations. Furthermore, software selected should be structured to build upon individual strengths.

102 Flowers, S. (Project Director) (1983-1986). National Rehabilitation Information Center (NARIC): Abledata information system. (The Catholic University of America, 8807 Eighth Street, N.E., Washington, D.C., 20017; (202) 635-5822) Grant awarded from the U.S. Department of Education.

The National Rehabilitation Information Center (NARIC) provides access to two databases: (1) REHABDATA, a file of NIHR- and RSA-funded research and other literature pertaining to rehabilitation; and (2) ABLEDATA, a file of assistive device information for the disabled. ABLEDATA staff also train rehabilitation professionals to be ABLEDATA information brokers. Training is conducted in workshops which include hands-on training in file-searching.

103 Foster, C. (1983). An analysis of the rise and fall of programmed instruction: Implications for computer-assisted instruction. Journal of Special Education Technology, 6(1), 5-14.

Compares teaching machines and programmed instruction to computer-assisted instruction (CAI). The author discusses their similarities and describes attitudes and research regarding programmed instruction and computer use. It is recommended that computers be integrated into the educational structure with better planning. CAI incorporates several characteristics of programmed instruction (e.g., active response by learner, frequent use of sequenced material, and feedback). Research pertaining to programmed instruction can be used as a starting point for research on CAI, based on their shared qualities. CAI has several advantages over programmed instruction as presented by textbooks or teaching machines. First, CAI allows flexibility for the learner through program branching which can be inserted for more individualized instruction based on learner responses. Second, learners cannot see answers early. Strategies for achieving educational goals using CAI include: (1) individualization, (2) record keeping, (3) quality instruction (better utilization of teacher's time), and (4) the competent learner.

104 Foulds, R. (Project Director) (1983-1988). Communication aids for non-vocal persons. (Rehabilitation Engineering Center, Tufts New England Medical Center, 171 Harrison Avenue, Boston, Massachusetts; (617) 956-5036) Grant awarded from the U.S. Department of Education.

The purpose of this Rehabilitation Engineering Center is to develop communication systems with special emphasis on non-vocal communication. Fourteen research and several education projects have been funded to maximize clients' available motor skills by developing appropriate interface strategies.

105 Frankel, F., Forness, S., Rowe, S., & Westlake, J. (1979). Individualizing schedules of instruction for school children with learning and behavior problems. Psychology in the Schools, 16(2), 270-279.

Explains how computers were used to generate monthly schedules of instruction for 12-16 children (ages 2-12, functioning at preschool and kindergarten levels) at the Neuropsychiatric Institute School, UCLA. A computer program was also developed to group different types of children together for individual instruction, based on similarities in behavior ratings and common academic developmental levels. Prior to the eight-month study, the average time required to prepare teacher-written schedules was approximately 14.5 hours per month. During the study, teacher-prepared schedules were used as the standard against which computer-prepared schedules were used as the standard against which computer-prepared schedules were compared for revision. By the fourth month, computer-generated schedules required minimal revision and were then used on their own. Teacher time required to program computer-generated schedules averaged less than two hours per month.

106 Freston, C. W. (Project Director) (1983-1986). Development and dissemination of microcomputer curriculum-monitoring and instruction decision-making programs (MID-programs). (Special Education, Utah State Office of Education, 250 East Fifth South, Salt Lake City, Utah, 84111; (801) 533-5982) Grant awarded by the U.S. Department of Education.

The purpose of this project is to facilitate individualized instructional development by special education teachers. The project will develop curriculum-monitoring and instruction decision-making programs (MID-programs), develop accompanying computer software, validate the programs, develop materials, implement teacher training programs, and evaluate the project.

107 Friedland, E. (1983). Micros: The dance of Shiva. The Computing Teacher, 10(6), 4-5.

Presents views on the impact of microcomputers in the lives of disabled persons. Essentially, the lives of physically and mentally handicapped persons will change as computers transform society. This author is, himself, physically disabled. He found it necessary to retire from university teaching as a result of a progressive disability. He now uses the computer technology as a vocation. Specifically, he is a board chairperson of an educational software company. It is perceived that the most crucial development in computer technology is in the field of artificial intelligence (AI). AI will be used to challenge students to examine and refine structures of thinking in the process of teaching the computer.

108 Friedman, R. (1980). The use of computers in the treatment of children. Child Welfare, 59(3), 152-159.

A high-speed electronic data processing procedure was used in a residential treatment program at St. Mary's Home for Boys in Beaverton, Oregon. The purpose of this study was the upgrading of the information base for treatment. The method involves staff observations and recording the presence or absence of 16 defined social behaviors in a group of 46 behaviorally disturbed adolescents. A number of preconditions for implementing this automated method to cross-confirm observations are discussed. The recorded information did provide a more rounded picture of each child due to the speed and clarity with which the information was collected, organized, and presented.

109 Friedman, S. G., & Hofmeister, A. M. (1984). Matching technology to content and learners: A case study. Exceptional Children, 51(2), 130-134.

Explains the development of a microcomputer/videodisc-based instructional system for use with handicapped learners. The system, developed at Utah State University, does not require extensive teacher involvement. The goal of the project, Interactive Videodisc for Special Education Technology (IVSET), is to assess the feasibility of using this technology with a range of curriculum areas and handicapped learners. Discussed is the specific program developed to teach time-telling. Results of the field testing and implications of the program are addressed. All subjects (four 7-9 year old resource room students) learned to tell time fluently within six weeks without teacher intervention. The overall approach does not compare teachers to machines, but emphasizes the simultaneous use of teachers and technology to increase educationally productive time for handicapped students in individualized classrooms.

110 Furst, M. (1983). Building self-esteem. *Academic Therapy*, *19*(1), 11-15.

Presents an instructor's account of how classroom computer use helps learning disabled students achieve immediate academic goals and other learning skills (e.g., focusing attention, ignoring peripheral distraction, and logical thought organization). Also noted is how the students learn that their thoughts and ideas are important, even though they can't read well.

111 Gelatt, J. P. (Project Director) (1983-1986). *Leadership training in computer technology*. (American Speech - Language - Hearing Association, 10801 Rockville Pike, Rockville, Maryland, 20852; (301) 897-5700) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop and field-test a five day workshop on the applications of the microcomputer in the delivery of special education services to communicatively handicapped children and youth. The workshop, which is designed for university faculty in special education, speech-language pathology and audiology programs, will address the following eight topics: (1) diagnostic applications in speech and language learning disorders, (2) diagnostic applications in hearing disorders, (3) education management systems, (4) CAI coursework, (5) development and use of augmentative devices, (6) data processing/record keeping, (7) development of applications for the language delayed child, and (8) electrophysiological measurements. The products to result from this project are a workshop manual, workshop videotapes, and other supplementary training materials.

112 Geoffrion, L. D. (1981-1982). Computer-based exploratory learning systems for handicapped children. *Journal of Educational Technology Systems*, *10*(2), 125-132.

Addresses ways in which computer-based instruction meets the learning needs of severely handicapped children. A fundamental special education need is to improve communication skills such as those taught through language arts programs consisting of drill and practice computer assisted instruction (CAI). Another approach is the implementation of Computer Based Exploratory Learning Systems (CBELS). This type of system emphasizes using the computer to explore the environment and to meet internally-generated goals. CBELS that are described include: (1) talking typewriter (Edison Responsive Environment), (2) Logo, (3) Computer Animated Reading Instruction System (CARIS), (4) BBN Mail System, and (5) TERAK Writing Laboratory. The author concludes that exploratory learning is feasible with severely handicapped students and that its principle asset is reduced emphasis on response correctiveness.

113 Gergen, M., & Hagen, D. (1985). Computer technology for the handicapped. Proceedings from the 1984 Closing the Gap Conference. Hutchinson, MN: Crow River Press.

This national conference was sponsored by Closing the Gap, a newspaper dedicated to microcomputer uses for the disabled. The proceedings include 47 papers subsumed under the following headings: (1) general, (2) mentally handicapped, (3) physically handicapped, (4) speech, (5) hearing, and (6) special education.

114 Goldenberg, E. P. (1979). Special technology for special children: Computers to serve communication and autonomy in the education of handicapped children. Baltimore: University Park Press.

The major theme of this book is that the computer provides a flexible technology that can thoroughly enrich the experiences and communciation of certain handicapped children (e.g., autistic, deaf, cerebral palsied). The author clearly takes the position that the most effective way to achieve this goal is by viewing the computer as a "prosthetic" versus a "tutorial" device. In other words, emphasis throughout the book is on how the computer can become the tool of the child instead of the tool of the teacher. Instead of the computer being used as a medium for a program designed by the teacher to lead the child through a sequence of steps to learn some desired behavior, this author views it as a prosthetic medium through which the child can explore. A discussion of the use of the computer language Logo for exploration by handicapped children is a major focus of the book. The book is organized into the following four parts: (1) a philosophy of educating handicapped children and the role computers can play in that process; (2) the psychology and education of three groups of handicapped children (i.e., physically handicapped, deaf, and autistic); (3) computer technology; and (4) research issues concerning the usage of computers and handicapped children.

115 Goldenberg, E. P., Russell, S. J., & Carter, C. J. (1984). Computers, education and special needs. Reading, MA: Addison-Wesley.

The learning issues of communication, access, and motivation are central to this book on computer applications for special needs settings. Choosing appropriate computer interventions for communication depends on a person's disability and history. Many case studies are presented as examples of how to implement the computer as a tool in a language learning environment. The emphasis is on allowing the disabled person to exercise control in order to develop communication. By providing increased access, the computer allows children to exercise power and control, rather than passivity, in a new and socially acceptable manner. It is, therefore, the computer's ability to motivate activity that may be its greatest potential in special education. Included is a glossary of special education and computer terms, as well as a resource section listing associations, organizations, training and resource centers, publications, networks, software publishers, and sources of input and output devices.

116 Goodman, E. (1983). A day in the resource room with a minicomputer. Journal of Learning Disabilities, 16(2), 117-118.

Reviews the activities that take place in an elementary school learning disabilities resource room. A personal computer and teacher-developed software program are used in combination with traditional teaching techniques. The computer programs train eye-hand coordination, left-right orientation, spatial relations, and creativity. Computer use also serves as a reward for and reinforcement of pencil and paper work and helps students gain computer competency.

117 Gore, W., & Vance, B. (1983). The micro meets the IEP. Academic Therapy, 19(1), 89-91.

Describes a microcomputer system that stores goals and objectives designed to reduce the amount of time professionals spend developing and writing individualized educational programs (IEPs) for handicapped students. The system also creates specific goals and objectives that provide consistency throughout the school system. The goals and objectives retrieval system is run on a Radio Shack TRS-80 with dual 8" floppy disk drive and a printer. Teachers list identification numbers from a menu that correspond with goals and objectives they wish to appear on the IEP. The computer prints the selected goals and objectives within the framework of an IEP, which can contain up to 35 goals and 350 short-term objectives.

118 Gray, L. (1984). Logo helps remove children's handicaps. Educational Computer, 4(1), 33-38.

Summarizes Logo's benefits for normal and special education students. Also cited are several Logo projects with handicapped children in Massachusetts, Texas, and Connecticut. Though the author sees definite application of the informal learning with Logo to traditionally taught subjects, the side benefits of working with Logo are those emphasized. Those benefits include self-confidence, creativity, problem-solving skills, and motivation. Use of Logo with exceptional children is still in the infant stages. A project now underway at the Massachusetts Institute of Technology hopes to further define Logo's potential in special education.

119 Gray, R. A., & Masat, L. J. (1982-1983). Instructional values of microcomputers for handicapped children. Journal of Educational Technology Systems, 11(1), 35-41.

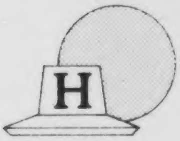
Discusses the potential value of microcomputers in educating the handicapped student population. The areas addressed are system selection, usage with handicapped students, and the instructional value of the microcomputer. Prior to selecting a system, it is recommended that school personnel determine its principle use. Potential uses include both instructional and/or administrative. Once the use is defined, consideration should be given to the cost, ease of operation, available software, etc. Matching technological capabilities with the learning requirements of particular target groups (deaf, blind, etc.) is essential information that is available in professional literature. It is suggested that this information be sought to increase the knowledge base regarding its use with handicapped students. Several contributions that microcomputers make to instruction are listed (e.g., individualized presentation, immediate feedback, etc.).

120 Grossman, R. P. (1983). On line. Journal of Learning Disabilities, 16(1), 58-60.

Presents problems and potentials for microcomputer use in the schools. The author cautions that the computer evolution of the 70s faded due to oversell before the necessary hardware and software were available. The author discusses a variety of topical issues, such as computer literacy, for administrators and students. A list of 10 standards ("ten commandments") by which to evaluate software programs is also presented. Some of these standards include: (1) the program should not give audible response to student error, (2) the program should not reward failure, (3) the instructions should be adequate, (4) the program should be adequately documented, and (5) the producer should provide one back-up copy. Finally, the author identifies several major resources for locating educational software.

121 Grossner, C. P., Radhakrishnan, T., & Pospiech, A. (1983). An integrated workstation for the visually handicapped. IEEE Micro, 3(3), 8-16.

Describes a computer workstation designed to overcome access and use difficulties experienced by handicapped users. The workstation is integrated for use with a resident CP/M operating system and can run any CP/M-compatible program. The main subsystems and components that are required for this workstation include: (1) a generalized text-to-speech conversion system such as the Votrax Type'N'Talk or the Intex Talker; (2) a Braille display device which displays a selected line of text; (3) a personal computer with the necessary memory, storage, ports, and facilities for program development; and (4) software drivers to connect speech and Braille output devices to the personal computer and route the information appearing on the screen to the appropriate channel. Also described is the workstation architecture and software structure.



122 Hagen, D. (1984). Jason says "yes." The Pointer, 28(2), 40-43.

Discusses hardware and software adaptations made to accommodate the needs of a seven-year-old blind, cerebral palsy child. The equipment used includes the Apple IIe computer, ECHO speech synthesizer, and Adaptive Firmware Card.

123 Hagen, D. (1984). Microcomputer Resource Book for Special Education. Reston, VA: Reston Publishing Co., Inc., a Prentice-Hall Co.

The material in this book covers the use of the microcomputer and microtechnology with the handicapped population in special education. The first half of the book is divided into chapters including topics on Logo, communicaiton, implementation, specific disabilities, and the future. The second half of this resource book provides the reader with detailed appendices on the following subjects: (1) software publishers and distributers, (2) selected software for special education, (3) physically handicapped, (4) blind, (5) authoring systems, (6) administration, (7) special hardware selections, (8) on-line services, (9) Logo, and (10) print resource. Reference materials, bibliographies, and program listings, all with contact information, are included.

124 Hagen, D., & Hagen, B. (1983). A newspaper covering microcomputers in special education: Specializing within a specialty. The Computing Teacher, 10(6), 60-61.

Describes the process that led to creating a newspaper whose sole content is information regarding microcomputer usage for handicapped persons. This publication, Closing the Gap, was developed by the parents of a student in special education. It consists of information pertaining to "user" rather than "programming" applications. In addition, workshops are also conducted to assist readers in implementing ideas produced in Closing the Gap. After eight months, three things have become obvious to the publishers: (1) the computer industry is competent in producing hardware but is just beginning to understand the special needs market it serves, (2) the existing hardware and software can serve many of the needs of the handicapped, and (3) the need for using microcomputers in special education is more pressing than the comparable need in regular classes.

125 Handicapped Educational Exchange (HEX) (Network). 11523 Charlton Drive, Silver Spring, Maryland, 20902.

HEX is a free national computer network devoted to the exchange of ideas and information on the use of advanced technologies to aid handicapped individuals. This information bank includes source listings of computer assisted instructional materials, software, and machinery for the handicapped. It can be accessed with any microcomputer, modem, and telephone or TDD. Information about the Exchange is available by calling (301) 681-7372. The computer access phone is (301) 593-7033.

126 Hanley, T. V. (1983, August). Microcomputers in special education--highlights of current research. Presentation to Mid-South Regional Resource Center, Wrightsville Beach, North Carolina.

Documents the major findings of a two-year research and information development effort conducted by SRA Technologies of Arlington, Virginia and

Cosmos of Washington, D.C. A synopsis of the findings as they relate to organizational issues is presented in four sections. These sections are: (1) special education use of microcomputers, (2) administration and supervision of microcomputers, (3) balancing instructioinal and administrative applications, and (4) training and emerging roles. SRA produces information packets based on current research. A broad range of topical areas is available. A selected resource list of software clearinghouses, educational software suppliers, books, periodicals, and other information resources is included.

127 Hanley, T. V. (1984). Macro-research on technology: Micro-research on education. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 44-65). Washington, D.C.: National Association of State Directors of Special Education.

Reviews the research on the use of computer assisted instruction (CAI) and presents a paradigm for future research. Macro-research needs to investigate issues related to the implementation of technologies in schools while micro-research needs to concentrate on the process of learning. It is suggested that the role of the special education teacher be considered. Effective use of CAI would convert them into "educational researchers." The author recommends ways to improve teachers' knowledge of educational principles as well as technologies. Envisioned is a broad range of applications beyond CAI, including: (1) instructional applications (i.e., CAI, CMI, computer literacy, and computer programming/science); (2) administrative applications (i.e., financial and information management systems, word processing, and mailing); and (3) impairment compensation (i.e., sensory, communication, physical control, personal management, vocational opportunity).

128 Hanley, T. V. (1984). Microcomputers in the schools--implementation in special education. Arlington, VA: SRA Technologies, 901 S. Highland Street.

Reports the findings of studies on organizational issues of microcomputers in special education. Case studies in 12 school districts were conducted with the focus being on the following organizaitonal issues: (1) the ways microcomputers were introduced, (2) the people managing them, (3) collaboration between special and regular educators in the use of the equipment, (4) training for teachers, and (5) roles that emerged to foster and support the microcomputer applications. The issue of diversity of administrative and instructional applications across the districts made for a complicated study. It is clear, however, that the uses of the two gruops are clearly separate. Administrators use microcomputers to support record-keeping and clerical tasks (i.e., word processing, financial, statistical, graphic, and file management systems). Teachers use microcomputers to provide direct instructional services (i.e., CAI, computer literacy, computer science, and CMI).

129 Hannaford, A. E. (1983). Microcomputers in special education: Some new opportunities, some old problems. The Computing Teacher, 10(6), 11-17.

Discusses various uses of microcomputers in special education. Three broad areas of use include compensation, management, and instructional delivery. Compensatory uses consist of assistance to persons with sensory losses through the development of hardware and software that enable deaf individuals to "hear" speech or blind individuals to "see." Specifically, computer technology has developed a bioear for deaf individuals and visual cortex electrical stimulation techniques for blind persons. Regarding the communicatively disabled person, technology has incorporated the use of speech synthesis, computer controlled communication boards, voice recognition, etc. Managerial uses involve implementation of both personal and educational management programs. Word processing, information storage and retrieval packages all assist disabled individuals in the management of personal affairs. Conversely, programs to develop and output IEP reports and schedule students in special education classes are examples of educational management packages. With reference to instructional delivery, various types of computer assisted instruction (CAI) packages are defined as well as the advantages and problems associated with CAI.

130 Harlan, D., Larimore, H., & Smith, M. (1984). Computer processing of SICD data. ASHA, 26(5), 23-25.

Describes the use of the Sequenced Inventory of Communication Development program (SICD) for use by speech-language clinicians. SICD is an efficient and expedient way to score, store, and present test data. SICD can also provide test interpretations, service analyses, and clinical population statistics. Such information and the speed at which it can be acquired as compared to traditional means, increases the capabilities for clinical use and research.

131 Harrison, C. H. (1984). Business information processing education for the disabled. Educational Computer, 4(1), 20.

Business Information Processing & Education for the Disabled (BIPED) is a non-profit, non-stock corporation, owned, funded, and managed by 20 Fortune 500 companies located in Connecticut. The companies pay the total costs for 11 months of intensive training for disabled persons in computer programming and place them in jobs with starting salaries of $15,000 to $19,000. The curriculum is designed to the exact specifications of industries that hire people with such skills. Those skills include: (1) computer programming skills, (2) systems analysis, (3) job interview skills, and (4) on-the-job work experience in the sponsoring companies. The sponsoring companies view their participation as performing a valuable social service in addition to gaining well-trained employees for a reasonable investment of time and money.

132 Harrod, N., & Ruggles, M. (1983). Computer assisted instruction: An educational tool. Focus on Exceptional Children, 16(1), 1-8.

Provides an overview of computer literacy and computer assisted instruction (CAI). The types of CAI identified are: (1) drill and practice, (2) tutorial, (3) instructional game, (4) simulation, (5) problem solving, (6) demonstration, and (7) mini-programming for CAI. The primary issues surrounding CAI are those of existing courseware, documentation, purchasing power, compatibility, teaching competencies, student performance, and the lack of standards. The factors that should be considered when evaluating courseware include examining the directions, the interactive capabilities, and whether voice-synthesized instructions are available for nonreaders. Several pros and cons of micros are also discussed.

133 Harvey, W. J., & Ginther, D. W. (1984). Lowering the barriers to computer use. The Computing Teacher, 11(8), 45-47.

Describes a three-level model of adaptations and interventions available to teachers who must facilitate computer use for handicapped students. The first level includes modification of the classroom environment, such as table heights, lighting, and computer positioning. This level also includes practical assistance in orienting the student to the equipment, in operation and character perception, and in diagnostic support, particularly at the college level. At the second level, instructors can select software to accommodate special needs, such as choosing sequential rather than simultaneous key stroke commands. Logo, a computer language, is noted for its ease of use by handicapped students. Instructional text should be flexible to match skill levels and assumed knowledge with instructional materials. Word processing and spelling software may be important to poor spellers, readers, and writers. The third level of instructional adaptation involves selection and modification of hardware. Modifications include speech synthesizers and special keyboards. Other desirable features include small and separate keyboards for wheelchair users and large character display on computers with full graphics capabilities. Commodore PET models 4016 and 4032 are noted for their reduced need for shifting; Radio Shack models III and IV have built-in wide format character display capabilities.

134 Hasselbring, T., & Hamlett, C. (1984). Planning and managing instruction: Computer-based decision making. Teaching Exceptional Children, 16(4), 248-252.

Explains the technology of decision making in planning and managing the instructional programs of special needs students. Described is AIMSTAR, which is a computer program that allows a user with no computer experience to manage student performance data, graphing, and flow chart analysis. Formal decision rules based on graphed data are defined according to acquisition problems, fluency problems, and incorrect instructional steps. A person using AIMSTAR must first create students' files and then collect and enter data. The program then evaluates the data using the decision rules. Teachers gain useful information based on empirical data and analytic procedures.

135 Hayden, D., Vance, B., & Irvin, M. (1982). A special education management system. Journal of Learning Disabilities, 15(6), 374-375.

Describes special education as an area where computers are needed in instruction and management. Implementation of the Education for All Handicapped Children Act (Public Law 94-142) has required data organization to reduce paperwork load and the possibility of data collection duplication. Special Education Management Systems (SEMS) are being implemented in pilot projects around the country. The purpose of SEMS is to help resolve the instructional management needs of special educators and staff, as well as the need for effective management of student information.

136 Hazan, P. (Project Director) (1983-1985). Microcomputer software for individually managed instruction. (The Johns Hopkins University, Applied Physics Laboratory, 34th & Charles Streets, Baltimore, Maryland, 21218; (301) 953-7100) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop and assess an authoring system to be used by special educators for producing individualized programs of computer assisted instruction for students with widely varied handicaps. The system will require no programming knowledge in instructors and no special major equipment for schools.

137 Heckathorne, C. W., & Childress, D. S. (1983). Applying anticipatory text selection in a writing aid for people with severe motor impairment. IEEE Micro, 3(3), 17-23.

Describes communications aids that use scanning as an input technique because of its simplicity and versatility. Anticipatory scanning, in which the system anticipates the next letter or word a disabled user is likely to choose, permits more efficient text generation for educational and vocational tasks. The system described is the Northwestern University Communication and Device Control (CDC) system. System functions described include: (1) letter selection, (2) word anticipation, (3) editing, and (4) device control. Other additions and applications suggested for the system are the incorporation of a dictionary to improve communication efficiency and programming the text-generating features of the CDC system into a device that would serve as an alternative input device to a personal computer running standard software.

138 Heller, N. (1983). Computers in an urban library media center. The Computing Teacher, 10(6), 51-54.

Discussed is the successful implementation of microcomputers into a school media center. This intermediate school has a large special education department with neurologically impaired, emotionally disturbed, and socially disadvantaged students. For many of the special education students, English is a second language. Difficulty with English has created poor academic performance and low self-esteem. Use of microcomputers by these students has resulted in positive effects. Some of the students learned elementary programming. In addition, software use has (1) assisted them in learning to follow directions, (2) enabled them to experience success, and (3) allowed them to learn without embarrassment. Acting-out behavior was not an issue because such behavior resulted in loss of computer privileges. One additional projected use of the microcomputer is library information storage and retrieval.

139 Heward, W., Test, D., & Cooke, N. (1981). Training inservice teachers to use technology: Experience with the visual response system. Teacher Education and Special Education, 4(3), 15-26.

Includes a brief description of the Visual Response System (VRS), which is a specially designed classroom consisting of eight to ten student desks equipped with overhead projectors and headphones connected to the teacher's desk. The teacher's desk is equipped with an overhead projector, a control panel that operates student projectors, a sound system, electric counters, and feedback lights for individual student responses. The inservice training program to initiate teacher use of VRS is also described. The training program topical areas are: (1) operation of hardware, (2) instructional techniques, (3) local production of software, and (4) teaching in the VRS. Eleven suggestions are made for planning, implementing, and evaluating a teacher inservice program.

140 Hill, E. W., & Bradfield, A. L. (1984). Electronic travel aids for blind persons. Exceptional Education Quarterly, 4(4), 74-89.

Examines four of the most widely accepted electronic travel aids, their uses, and applications. The four aids discussed are: (1) the Lindsey Russell Pathsounder, (2) the Mowat Sensor, (3) the Sonicguide^{tm}, and (4) the C-5 Laser Core. Originally electronic travel aids were designed for the adult blind population as supplemental systems to the long cane or dog guide. The use of them has since spread, but high cost, cosmetic considerations, and inconvenience keep that usage low. The author contends that research about spatial and perceptual information must be addressed if these aids are ever to become widespread.

141 Hilldrup, R. P. (1984). The micro in the chemistry lab: An aid to the visually impaired. Educational Computer, 4(1), 29-30.

Describes a project at East Carolina University in Greenville, North Carolina that has discovered new uses of microcomputers in chemistry labs for blind students and for students with upper limb disabilities. Universal Laboratory Training and Research Aid (ULTRA) combines microcomputers and Dumb Talking Box (DTB), a device that reads instruments by sound to allow the blind to work independently. Software, using FORTRAN, and a hardware system using the Zilog Z80 board family are also being developed to increase the number of chemistry laboratory experiments to be performed by the visually handicapped. In addition, experiments on the addition of a voice-activated element are being conducted for use with sighted students who have upper limb disabilities.

142 Hoefer, J. J., Arnold, P. F., & Waddell, M. L. (1983). A touch of Braille. Microcomputing, 7(11), 50-53.

Provides a listing of the Braille Trainer Program for use on a Commodore PET microcomputer and a keypad consisting of seven normally open springloaded switches. The program is also sized for use with a VIC-20; the necessary program changes are included. The program randomly presents characters or letter groups to be transcribed in braille. Three levels of difficulty are included: (1) Easy--letters and some punctuation, (2) Medium--simple contractions, and (3) Hard--two-celled contractions. An "attaboy" signifies a correct response; if incorrect, the actual character transcribed and the correct transcription are provided together. Noting that the Commodore VIC-20 sells for less than $100.00, this paperless braille trainer is described as more affordable than a brailler machine, in addition to reducing training time and effort.

143 Hofmeister, A. M. (1984). Technological tools for rural special education. Exceptional Children, 50(4), 344-349.

Examines the potential use of the new technologies for disseminating information and achieving "universal excellence" in special education in rural areas. Videotex, a term describing computer-stored information available by computer screen or printing terminal, exists in interactive and noninteractive forms. Interactive videotex usually moves information via telephone lines (e.g., electronic mail and computer conferencing). Examples of large Interactive Videotex information bases are SpecialNet, CompuServe, and the Source. Noninteractive videotex is usually transmitted via television signals (e.g., captioning service for the deaf).

144 Hofmeister, A. M., & Thorkildsen, R. (1984). Microcomputers in special education: Implications for instructional design. Exceptional Education Quarterly, 4(4), 1-8.

Discusses instructional design issues regarding the development of computer-assisted and computer-managed instruction and their implications for special education. Algorithmic procedures, or problem-solving by utilizing a series of steps, and heuristic procedures, which are similarly structured but rely on probabilities for decision-making, are discussed as alternatives for courseware construction. Also discussed are individual rates of learning and the computer's ability to provide feedback. Types of feedback mentioned include: (1) verbal (e.g., teacher or machine indicate "right" or "wrong"); (2) symbolic (e.g., tones, lights, animations); and (3) tangible (e.g., teacher or machine dispenses reward token). Feedback combines with student responses in three ways: (1) right-wrong feedback (feedback follows both right and wrong responses), (2) right-blank feedback (feedback follows only correct responses), and (3) wrong-blank feedback (feedback follows only incorrect repsonses). Task hierarchies are also discussed.

145 Horgan, J. (1984). Medical electronics. IEEE Spectrum, 21(1), 90-93.

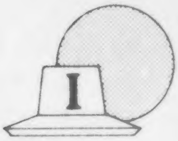
Describes research and development in the following fields: (1) electrical stimulation to limbs and organs, (2) artificial limbs and robotic aids, (3) sensory and communication aids, and (4) functional assessment systems. Electrical stimulation is being used in arm, leg, and hand muscles, to permit grasping, walking, posture adjustment, and bladder control. Research on artificial limbs includes an active limb that can store energy in the braking portion of stride that helps power the leg for active work, a prosthetic leg that "echoes" the movements of the real leg, and the "Utah arm," which is capable of movemenet stimulated by myoelectric signals generated by muscles in the upper-arm stump. Electronics that help the deaf and speechless include an eight-channel artificial cochlea, also known as a bionic ear, a wheelchair equipped with a communication system that includes an electronic display screen and a voice synthesizer, and a communication device that interprets EEG signals of eye movement to select characters on a display screen. Functional assessment systems, which measure such functions as alertness, short-term memory, and strength and coordination, have received major grants from the National Institute of Handicapped Research.

146 Horn, C. J., & Finn, D. M. (1983). Sources of computing. Focus on Exceptional Children, 16(2), 1-16.

This article is intended as a current reference on sources of information on computing and education. As such, it includes descriptions of hardware producers (computers and peripherals), software houses, hardware/software reviewers, information exchange systems, resource networks, journals and publications, and related technological developments. Over 500 addresses are listed.

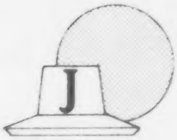
147 Hutchins, S. E. (Project Director) (1983-1984). *Recognition of children's speech patterns*. (Emerson & Stern Associates, 13764 Boquita Drive, Del Mar, California, 92014; (619) 481-3242) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a software-based, independent speech recognizer system that will forgive pronunciation errors and is particularly adapted to recognizing speech in children's voices. The system will begin by recognizing 50-100 words but will eventually expand to a larger vocabulary.



148 International Council for Computers in Education (ICCE). University of Oregon, 1787 Agate Street, Eugene, Oregon, 97403-1923; (503) 686-4414.

ICCE is a professional organization of educators interested in the use of computers in the classroom. A special interest group for special educators (SIGSPED) provides parents and educators with a forum for sharing ideas and concerns on the use of technology through the quarterly *SIG Bulletin*, local chapters, and conference presentations. Membership in ICCE is $21.50 annually, which includes nine issues of *The Computing Teacher*, a journal that includes information pertinent to special education. Membership in SIGSPED is $10.00 for ICCE members and $15.00 for nonmembers. Additional publications available include *Learning Disabled Students and Computers: A Teachers Guide Book* ($2.50) and *Computer Technology for the Handicapped in Special Education and Rehabilitation: A Resource Guide* ($7.00). A publication catalog with ordering information and quantity discount prices is available upon request.

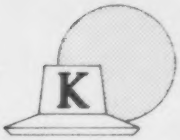


149 Jampolsky, A. (Project Director) (1980-1985). *Sensory aids for the blind*. (Smith Kettlewell Institute of Visual Sciences, 2232 Webster Street, San Francisco, California; (415) 563-2323) Grant awarded from the U.S. Department of Education.

The following sensory guides have been developed for use by the visually impaired at the Smith Kettlewell Institute: (1) the Computerized University Tone Indexer--inserts a normally inaudible tone while tape recording materials; (2) the Talking Signs system--pedestrian and other street signs contain spoken message on a computer chip, which is activated by a directional receiver; (3) Auditory Arcade--computerized electronic games modified for use by nonvisual users; and (4) Beep Ball--audible remote controlled base markers for a softball game adapted for blind players.

150 Johnson, E. L. (1984). Computing and handicapped education. Educational Computer, 4(1), 27-28.

Overviews the results of a project to evaluate the difficulties the handicapped might have in using a PLATO terminal and courseware. Wichita State University Rehabilitation Engineering Center and the Kansas Cerebral Palsy Research Foundation were involved in the project funded by Control Data Corporation. Suggestions for removing some access barriers, including two-key control input and fixed time respones, are included.



151 Kimbler, D. L. (1984). Robots and special education: The robot as extension of self. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 92-107). Washington, D.C.: National Association of State Directors of Special Education.

Discusses the use of robots as an aid to the physically handicapped, the requirements for robot performance, and the research agenda necessary for the use of robots in special education in the future. Those who might benefit from robots include the orthopedically handicapped, multihandicapped, visually impaired, and deaf/blind. The common characteristics of the robot extension for this population are mobility, payload capacity, sensory capabilities, and intelligence. While the robotic extension remains limited in its capabilities, it can provide a handicapped student with increased independence. Research in the system segments within an integrated set of design objectives is required. The physical aspects of the robot (dexterity and mobility) need to be linked with the control decisions. It is for this reason that research efforts need to be coordinated.

152 Kissick, L. N., Jr. (1984). Communication devices and an enriched live--an autobiography. The Exceptional Parent, 14(4), 9-14.

Presented is an autobiography on the life of a nonvocal person from infancy to independent adulthood. The author stresses how his life was drastically changed when he began communicating with an Express I, which is an electronic and technological communication system. With the advent of the Express III he was able to work easily with the Apple computers. The author is now a consultant for Prentke Romich Company, the distributors of Express I and III.

153 Kitterman, J. F. (1984). Error verification and microcomputer mediation of a spelling task with learning disabled students. Unpublished doctoral dissertation, Ball State University.

Presents the findings of an experiment comparing spelling instruction with sight words and a computer-assisted spelling program. A summary of the findings indicates that the microcomputer spelling program was not more effective than the traditional sight-word spelling approach but that attention-to-task behavior was enhanced. The author notes that the instructional value of much of the available software is questionable and should be carefully evaluated before abandoning traditional instructional methods.

154 Klein, S. (1983). Computer education: A catalog of projects sponsored by the U.S. Department of Education. Washington, D.C.: Superintendent of Documents, U.S. Government Printing Office. (GPO stock number 065-000-0202-7)

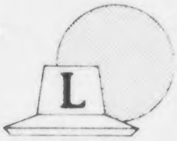
An extensive document on federally funded projects related to computers in education. Included are over 45 such projects pertaining to special education and special needs students. Each project includes a brief annotation, the target audience served, the major product to result, and the name and address of the project director. Most of these special education/special needs projects are referred to elsewhere in the Resource Guide II.

155 Kopp, H. G. (1981). Future implications for technology in the 80's. Volta Review, 83(5), 350-358.

Discusses why technological advances have surpassed application for the hearing impaired and what resolution must take place. Some issues discussed are the need for: (1) competent authoring of software systems, (2) accumulation of data on performance responses, (3) integration of language acquisition and performance competencies with subject matter, (4) more effective hearing aids, and (5) better evaluation of the new technology. The author encourages a collaborative effort of industry, government, the profession, and the consumer to ensure immediate, effective use of communication technology for the hearing impaired.

156 Krolick, B. (1984). Computer access for the visually impaired. The Computing Teacher, 11(8), 48-50.

Provides suggestions for encouraging computer familiarization for blind users. The author also discusses modifications and peripherals that enhance computer accessibility for input, visual output, voice output, braille output, and software designed for nonsighted users. Included is a list of available peripherals, software, and publications. The peripherals discussed include a braille keyboard for Commodore VIC 20 and 64 which can be adapted for interaction between sighted and blind students. Visual output can be improved by display enlargement (i.e., Visualtek Model DP-10 for Apple, DP-11 for IBM PC, and FIA lens adapter for Optacon from Telesensory, Inc.). Differences between voice output devices and microcomputer voice terminals are discussed. Software programs exist mostly for Apple II+ and IIe or Apple-compatible systems. Two companies, Raised Dot Computing and Computer Aids, provide software for blind users. Braille Edit by Raised Dot is discussed in some detail. Braille output peripherals include the slower, sheet-fed Cranmer Modified Perkins Brailler, the faster fan-fold paper braille embossers such as LED-120 and THIEL, and cassette paperless braillers such as the VersaBrailler and the MicroBrailler 2400. Braille transcription programs are available, allowing speedier hard copy preparation on Apple or IBM PC computers using Braille Edit on VersaBraille tapes.



157 Lamos, J. P. (Project Director) (1983-1985). Microcomputer software for individually managed instruction. (University of Denver, Denver Research Institute, Denver, Colorado, 80210; (303) 871-2271) Grant awarded from the U.S. Department of Education.

This project is designed to develop a two-level authoring system for individually managed instruction for handicapped students. Level one includes development of "micro-units" of instructional materials. At the second level of activity, the instructor combines micro-units to suit individual student needs. Micro-units will be designed to meet the instructional needs of specific disabilities.

158 Lance, W. (1977). Technology and media for exceptional learners: Looking ahead. Exceptional Children, 44(2), 92-97.

Stresses that special educators must take advantage of available technological knowledge and resources in order to bridge the present gap between inventions and their innovation, especially with requirements of Public Law 94-142. The author suggests four possible reasons for this gap: (1) education is a conserving institution, (2) educators can perceive technology as a threat to their jobs and their personal interactions with their students, (3) costs are high, and (4) vehicles to bridge the gap are not fully developed. The author also offers five reasons for the need for educational technology in special education. Several of these include the need to compensate for sensory impairments, manage the load imposed by the implementation of an individual education program for every exceptional pupil, and increase educational productivity. Developments in the application of technology to the needs of exceptional children are also mentioned: (1) computer applications (CMI and CAI), (2) video applications, (3) sensory compensation devices, and (4) communication satellite technology. In conclusion, the author strongly recommends that the federal government design a learning resource system so that successful technological innovations for the exceptional child can be efficiently disseminated to the state and intermediate or local learning resource center.

159 Larson, H. J. (1981). Analysis of alternative management information systems appropriate for special education application. Walnut Creek, CA: Decision Development Corp. (ERIC Document Reproduction Service No. ED208617)

Summarizes the results of three interrelated studies concerned with the utilization of computer-based management information systems employed to furnish special education reports to the state and federal government. Two of the studies report the actual use of computers by California school districts and county offices of education. The third study concerns the development of a data element dictionary based on the federal requirements for the reporting of special education data.

160 Latham, G. (1982). Technology literature review. Logan, UT: Intermountain Plains Regional Resource Center.

Presented is a review of the literature on technology and service delivery to handicapped students. A discussion of the use of technology in rural settings includes sections on television, videotapes, computer assisted instruction, telephone, packaged materials, and other materials. Annotated bibliographies for each area are provided. Technology for needs assessment and inservice training are also discussed. A product catalog from the Exceptional Child Center at Utah State is included. Two articles are reprinted entitled: (1) "Distance Education: Teacher Training Via Live Television and Concurrent Group Telephone Conferencing" by Kirman and Goldberg; and (2) "Technology in Special Education" by Blackhurst and Hofmeister. The document also includes an implementation model by Havelock and Lindquist and a report by public service satellite consortium entitled "Telecommunications in Rural America: Special Populations, Special Problems."

161 Lewin, A. W. (Project Director) (1983-1986). Nine credit pre-service certificate program to prepare special educators to use microcomputers. (Capital Children's Museum, 800 3rd Street, N.E., Washington, D. C., 20002; (202) 543-8600) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a program certifying pre-service special education instructors in the use of microcomputers. The course will include (1) orientation and applications of microcomputers in special education, (2) design of instructional and IEP systems development, and (3) CAI and CMI programming. Training will include use of Apple IIe, Atari, and Texas Instrument computers.

162 LINC Resources, Inc., 1785 Morse, Road, Suite 215, Columbus, Ohio, 43229; (614) 263-2123.

LINC is a professional marketing organization for special educators. It provides information and services to educators and developers of educational materials. It published the Specialware Directory and helps maintain two centers that serve the special needs community: Special Education Software Center and the Center for Special Education Technology Information Exchange.

163 Littlefield, P. (1983). Teaching writing with a word processor. Academic Therapy, 19(1), 25-29.

Describes a case study where a home computer is used to translate hand-written paragraphs by educationally handicapped 4th, 5th, and 6th graders into typed copy, errors and all, for self-correction. The project revealed that word processing frees students from frustration and reluctance to write, which results from difficulties in deciphering their own handwriting. Students concentrate on idea organization, gradually increase copy length, extend content editing, and develop pride in their work.

164 Littman, J. (1984). Open doors. PC World, 2(3), 244-251.

Case examples are presented to cite many new computer products and organizations which help the disabled work and communicate. The products discussed include: (1) ProKey H2.20, (2) Voice Recognition and Speech master boards, (3) Express III, (4) Koala Pad Touch Tablet, (5) PC Speak, and (6) Personal Speech System. In addition to presenting the manufacturers and prices for the products, the authors make reference to organizations which offer technical assistance to the disabled (i.e., American Foundation for the Blind, Disabled Programmers Incorporated, Sensory Aids Foundation, and Trace Research and Development Center). Personal computers equipped with technical aids will enable more disabled people to work and communicate, though the new technology will not solve all of the problems that disabilities present.

165 Louis, S. (1984). Robotics and the handicapped. SIG Bulletin, 1(4), 48-49.

A brief overview of the microworlds project which requires students, handicapped and nonhandicapped, to develop computer skills as a requirement for citizenship in a model production/service oriented society. Students are required to develop businesses that utilize computer and robotic technology and to act as council members in setting rules for government and assessment of fellow students' work. The microworlds project is an ongoing evaluation of the use of computers and robotics in the classroom.

166 Lunney, D. (Project Director) (1983-1984). Technology compensatory activities: Severely visually impaired persons. (East Carolina University, Greenville, North Carolina, 27834; (919) 757-6452) Grant awarded from the U.S. Department of Education.

The purpose of the project is to provide a portable talking laboratory computer that will accept input from scientific instruments and convert it to speech. The device will also provide spoken instructions, perform calculations, control external devices, and function as a talking terminal for use with other computers. The device is designed for use in secondary and college-level physics labs.

167 Lunney, D., Morrison, R. C., Cetera, M. M., Hartness, R. V., Mills, R. T., Salt, A. D., & Sowell, D. C. (1983). A microcomputer-based laboratory aid for visually impaired students. IEEE Micro, 3(4), 19-31.

Describes the Universal Laboratory Training and Research Aid (ULTRA) system. The system is a portable talking laboratory microcomputer with keyboard input, phoneme-based voice output, various analog and digital inputs and outputs, and an extensive software package designed to perform most freshman and sophomore-level chemistry lab instrumental measurements. The system functions as a (1) tutorial data acquisition and analysis computer, which aids and instructs students as they perform instrumental measurements and analyze results; (2) talking terminal; (3) talking scientific calculator that functions similarly to terminals and calculators used by sighted students; and (4) a personal computer with disk drives and CP/M. Construction and programminmg of the ULTRA are described. The lab experiment programs written for the ULTRA include weighing, pH measurment, pH titration, visible and infrared spectrophotometry, and gas chromatography. Experiments in titration and infrared spectrometry are described as performed in the lab by students using ULTRA. Evaluation by a visually impaired pre-med student and a blind member of the development team revealed that higher levels of independence and learning were acquired than when working with a sighted aid.

168 Lynd, C. (1983). A consumer's guide to computer-assisted learning. The Exceptional Parent, 13(4), 49-56.

Provides guidelines for the purchase and use of microcomputers and instructional software. The main points include discussion of the future of microcomputers for home and school use, the growing quality of software instruction programs, and cautions on purchasing software by mail. Also included is a listing of sources that specialize in courseware review and instructional software for special education.

M

169 MacArthur, C. (Ed.) (1984). Tools for communication (Special Issue). The Pointer, 28(2).

This special issue includes 10 articles for educators and parents of exceptional children on the use of microcomputers. Some of the topics discussed are computer assisted instruction software in special education, early learning through high tech, word processing, the Handicapped Educational Exchange (HEX), simulations in remedial and special education, and access technology for the visually impaired.

170 MacArthur, C. (1984). Simulations in remedial and special education. The Pointer, 28(2), 36-39.

Four general educational uses of computer simulation in special education are discussed. They include: (1) helping students learn about systems analysis and simulation as a scientific tool; (2) students using simulations to understand some system in the real world; (3) training students to apply skills and make decisions in real-life situations; and (4) exploration of fantasy, as in games, to sharpen map-making, note-taking, and logic and reasoning skills.

171 MacArthur, C., & Smith, J. (1983). The independent counterpoint. The Computing Teacher, 10(6), 68-69.

Defines the purposes and the contribution of Counterpoint, an independent publication devoted to programs, projects, anad issues in special education and related fields. This publication is interested in communicating various topics to professionals. One topical area is the application of computer technology to educate and rehabilitate individuals with handicaps. Articles from Counterpoint that discuss special education issues are cited. In addition, SpecialNet, which is a nationwide telecommunication system for special educators, is discussed. Features of SpecialNet include electronic mail and electronic bulletin boards on 20 topical areas. Counterpoint administers three of the bulletin boards, which are personnel preparation, applications of cable television, and effective practices in special education.

172 Maddux, C. D. (1984). Using microcomputers with the learning disabled: Will the potential be realized? Educational Computer, 4(1), 31-32.

Discussed are two distinctly different ways of using microcomputers with the learning disabled child. Type one is to use them to make it easier to continue doing the same things that have always been done.

Examples are administrative, assessment, and drill and practice. The other type is to use them in a new and creative manner that meets the individual needs of learning disabled (LD) students. Three examples include programming in Logo, simulation programs, and word processing. Reasons for using Logo are to allow the LD student successful control over the environment, practice in learning spatial relationships, and experience in planning the future. Reasons for the use of simulation programs are to lead children through a series of real or created situations that they might not otherwise experience.

173 Maddux, C. D., & Cummings, R. E. (1984). LOGO is for all children--learning with the turtle. The Exceptional Parent, 14(4), 15-18.

Describes Logo and how it can benefit exceptional children. The authors present seven reasons for making Logo available to disabled children. These reasons are: (1) immediate feedback permits correction without adult intervention and criticism; (2) disabled children who learn Logo can increase social status by instructing others in the regular program; (3) moving the Logo turtle around the screen aids children with limited mobility to understand spatial concepts; (4) for students with short attention spans, Logo is quickly learned and carries out each instruction as entered; (5) shows relevance of math by requiring numbers and arithmetic to make turtle go where one wants; (6) provides practice in trial-and-error problem solving; and (7) supplies practice and motivation to improve typing skills for students who have difficulty with handwriting skills.

174 Maddux, C. D., & Johnson, D. L. (1983). Microcomputers in LD: Boon or boondoggle? Academic Therapy, 19(1), 113-118.

Presents basic computer terminology and discusses problems encountered with drill and practice. Computer use for assessment and administrative work is discussed and potential uses of microcomputers in learning disability education are described. The uses are: (1) it allows the student to program the computer rather than the computer programming the student, and (2) word processing functions that allow the student freedom from laborious correction and teacher criticism to create and improve typing skills.

175 Maggs, P. (Project Director) (1983-1985). Technology compensatory activities: Severely speech and vision impaired persons. (Visek and Maggs, 207 W. Oregon Street, Urbana, Illinois, 61801; (217) 367-5027) Grant awarded from the U.S. Department of Education.

The purpose of this project is to use recently available computer chips to develop speech synthesizer/software packages designed to be used with the IBM PC, Apple IIe, and TRX-80 Model 100 microcomputers.

176 Malouf, D. (Project Director) (1983-1984). Investigation of the use of microcomputers in teaching autistic children. (University of Maryland, Department of Special Education, College Park, Maryland, 20742; (301) 454-6921) Grant awarded from the U.S. Department of Education.

The purpose of this project is to study the use of microcomputer instruction with autistic children. Alternative delivery systems, such as microcomputer instruction, may prove to be practical and economical.

177 Malouf, D. (Project Director) (1983-1986). Microcomputer-assisted needs assessment system for teacher training in special education. (Department of Special Education, University of Maryland, College Park, Maryland, 20742; (301) 454-6921) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop, test, and disseminate a microcomputer approach in needs assessment in teacher training in special education. The methodology to be used is the "rule-based expert system," which consists of programming principles drawn from the field of artificial intelligence. The products to result from this project are needs assessment software and documentation.

178 Malouf, D. (Project Director) (1983-1987). Research on the effectiveness of microcomputers in special education. (Department of Special Education, University of Maryland, College Park, Maryland, 20742; (301) 454-0921) Grant awarded from the U.S. Departmenet of Education.

The purpose of this project is to examine the types and characteristics of computer assisted instruction (CAI) likely to result in increased learning for cognitively impaired students. A number of factors will be studied, including: (1) the effects of "precorrection," (2) cumulative sequencing, (3) immediate and delayed feedback, (4) academic learning time, (5) motivation, and (6) response latency that can be used in instructional decision-making. In addition, factors related to the teachers' roles and functions and student groups will be examined.

179 Markoff, J. (1983). Well-net personal computer network serves the disabled. InfoWorld, 5(33), 15-16.

A weekly magazine reports the development and use of a personal computer network (Well-Net) designed to serve the information needs of the disabled. Presently, a community health information project in Santa Clara Valley, California has established a "Well-Net" network that is providing information such as ride boards, events, course listings, personal messages, legislation, recreation and sports activities, employment opportunities, housing, and care services to the disabled in their community. Information is accessible by anyone with a personal computer or a terminal and a 300-baud modem.

180 Marra, L. (Project Director) (1983-1986). *National rural independent living network*. (National Rural Independent Living Network, CID Suite Wells Hall, Murray State University, Murray, Kentucky, 42017; (502) 762-6810) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a network of rural communities and sharing systems to encourage the use of social and rehabilitative services for disabled persons of all ages. A major feature of the project is to provide computer communications and electronic mail to obtain information about rehabilitation from data bases.

181 McAlees, D. D. (Project Director) (1983-1985). *Costs, benefits, and potential applications of microcomputers and related software in management and operations of sheltered and transitional industries*. (Stout Vocational Rehabilitation Institute, University of Wisconsin - Stout, Menomonie, Wisconsin, 54741; (715) 232-1464) Grant awarded from the U.S. Department of Education.

The purpose of this project is to survey approximately 3,900 rehabiltiation facilities in order to determine the state of the art regarding the uses of computers in these settings.

182 McCaslin, P., & Stevens, L. (1984). Immediate openings. *The Pointer*, *28*(2), 16-19.

Reviews research on the use of computer assisted instruction (CAI) with learning disabled students. Shell programs, which allow teachers to use students' particular spelling or vocabulary lists to formulate specifically formatted question and answer drills and exercises, are discussed. The authors suggest four possible format examples. A brief case study of one school's experience with commercially prepared software is presented.

183 McCray, P. M., & Blakemore, T. F. (1984). *National directory of rehabilitation facilities using computers*. Menomonie, WI: University of Wisconsin-Stout, Stout Vocational Rehabilitation Institute.

This directory is an outgrowth of a national research study to determine the extent to which rehabilitation facilities are incorporating computer technology into their operations. The directory is divided into six sections: (1) a summary of the research findings, (2) an overview of how computers can be integrated into facility operations, (3) a listing of over 300 rehabilitation facilities willing to share their experiences with computer usage, (4) a listing of facilities by the major hardware used, (5) a listing of facilities by the software used, and (6) a listing of computer technology resources for rehabilitation facility personnel.

184 McDermott, P., & Watkins, M. (1983). Computerized vs. conventional remedial instruction for learning-disabled pupils. The Journal of Special Education, 17(1), 81-88.

This study was designed to assess the relative efficacy of computerized remedial methods over traditional remedial methods. Two-hundred-five learning disabled students (grades 1-6) were placed in computer assisted instruction (CAI) remedial math or spelling groups or in a traditional remedial control group. The results indicate the effectiveness of computerized and conventional instruction in math and spelling is similar for learning disabled students. As such, the authors discuss times in which the methods may be substituted for one another. For example, CAI programs could be used where they might reduce the motivational deficit and resistance of problem learners. By contrast, the teacher instructor method could be used when social support is needed.

185 McNeal, D. R. (Project Director) (1983-1988). Functional assessment and technology matching for handicapped persons. (Rancho Los Amigos Hospital, Rehabilitation Enginnering Center, 7601 East Imperial Highway, Downey, California; (213) 922-7994) Grant awarded from the U.S. Department of Education.

The purpose of Project Threshold is to use microprocessors/computers to assist severely handicapped clients in performing daily tasks at work, school, and home. Client needs are identified and met through applied rehabilitative engineering. In addition, Project Threshold offers support services to rehabilitation counselors, clients, and allied health professionals in the areas of Independent Living/Home Evaluations and Functional and Site Assessment of School/Job.

186 Messinger, M. (1983). Computer literate LD students shine at Lakewood Elementary School in Silicon Valley, California. Journal of Learning Disabilities, 16(7), 426-427.

Reviews a project at Lakewood Elementary School in Sunnyvale, California. Eleven learning disabled students in a special day class were trained to use microcomputers and then to tutor other students. The special education class began the tutoring process by holding a "guest day" for others to visit the classroom. The actual tutoring began with a first grade class. By the end of the year, the students had tutored 100 primary students from four classes. The most noticed gain from the experience was the students' increase in self-esteem.

187 Messinger, M. (1983). CP = computer proficient. The Exceptional Parent, 13(4), 57-60.

Presents the ingenuity of one family in their efforts to provide computer assisted instruction at home and finally in school for their 15 year old cerebral palsy child. This allowed her to be mainstreamed into a regular classroom.

188 Metzger, M., Ouellette, D., & Thormann, J. (1983). Learning disabled students and computers: A teachers guide book. Eugene, OR: International Council for Computers in Education.

Defines learning disability and introduces practical ways to use computers with this student population. A question and answer format allows readers flexibility in selecting information about theory, concerns, and misconceptions. The authors answer questions about software use, design, and development. The most common use with LD students is the computer as a tutor. This mode includes drill and practice, programmed instruction, educational simulations, and simulation games. Hardware components also are defined and illustrated. The reference section lists relevant magazines, books, organizations, networks, research projects, and bibliographies.

189 Meyers, L. (1984). Use of microprocessors to initiate language use in young non-oral children. The Exceptional Parent, 14(4), 19-24.

Computers were used in language intervention programs for handicapped children who were 18 months to three years old. The program is coupled with careful child and family assessment and strategy-matching with the child's abilities. The author indicates that most children began oral speech as a result of this intervention.

190 Microcomputers and the handicapped (1982). Byte (Special Issue), 7(9).

This special issue contains seven articles, the titles of which are: (1) "Computers Can Play a Dual Role for Disabled Individuals," (2) "A New Horizon for Nonvocal Communicaiton Devices," (3) "Minspeak," (4) "Talking Terminals," (5) "Braille Writing in Pascal," (6) "Adaptive-Firmware Card for the Apple II," and (7) "Logo: An Approach to Educating Disabled Children."

191 Microcomputers in Special Education (1983). Education Turnkey Systems, Inc., 256 North Washington Street, Falls Church, Virginia, 22046.

This document is one of four reports designed to assess the current state of new technologies and their uses in regular and special education and project the influence these technologies will have in special education over the next five years. Briefly discussed are hardware components, software, and prices of microcomputers. Represented are graphs of general usage microcomputers since 1965 in both instructional and administrative areas. Addressed are sale trends of manufacturers and needs of local education agencies (LEAs) in adopting microcomputer systems. Computer assisted instruction (CAI) and computer managed instruction (CMI) are defined for special education. Also discussed are benefits and cost of classroom and administrative applications. Affecting the use of these applications are key factors including advances in hardware technology, software development, improved commercial marketing and distribution, and enhanced LEA capabilities. The identified needs of LEAs include: (1)

technology orientation, (2) staff training in specific applications, (3) planning, and (4) modification of policies and procedures.

192 Microcomputers' place in special education (1982). Exceptional Children (Special Issue), 49(2).

This special issue contains 11 articles, the titles of which are: (1) "Computers and Education for Exceptional Children: Emerging Applications," (2) "Applications of Microcomputer Technology to Special Education," (3) "Microcomputers in Perspective," (4) "Microcomputers in Special Education: Promises and Pitfalls," (5) "The Microcomputer and Special Education Management," (6) "Microcomputer Software for the Handicapped: Development and Evaluation," (7) "Computer-Administered Bilingual Language Assessment and Intervention," (8) "Cameo: Computer-Assisted Management of Educational Objectives," (9) "Applications of Microcomputers in the Education of the Physically Disabled Child," (10) Making the World Work with Microcomputers: A Learning Prosthesis for Handicapped Infants," and (11) "ARC-ED Curriculum: The Applications of Video Game Formats to Educational Software."

193 Minick, B. A., & School, B. (1982). The IEP process--can computers help? Academic Therapy, 18(2), 141-148.

Discusses the increased record-keeping responsibilities generated by the process of developing IEPs and one method of computer management that can reduce the paperwork load. The Management and Assessment Program (MAP) services approximately 175 teachers and 3,000 special/regular education teachers, K-12, in Alleghany County, Pittsburgh, Pennsylvania. The system is used to maintain demographic and remedial need data and to generate evaluation procedures. The system is capable of producing individual student reports four to six times annually. A second part of the system provides a bank of resources that generates a list of suggested resource materials for individual students based on the teacher's analysis of student skills. MAP goals are discussed, along with the primary impact areas of the system's two components. The most impact has been noted in the following areas: (1) increased teacher efficiency, (2) increased teacher proficiency, (3) increased supervisory knowledge, and (4) increased parental knowledge and satisfaction. Recommendations for educators interested in computerizing the IEP process are made. Education design considerations and computer hardware and software considerations also are listed.

194 Morgan, K. L. (1983). Handicapped and working. Creative Computing, 9(8), 142-144.

Relates the author's personal history about the progression of his physical disability and the importance of microcomputers to him. Mr. Morgan became vocationally handicapped because of the progressive nature of rheumatoid arthritis which has culminated in homebound status. Vocational Rehabilitation purchased him a microcomputer and enlisted the assistance of rehabilitation engineers to develop a special microcomputer holding cart so that he could depress keys while confined to a special rotating bed. With this assistive apparatus, this man learned computer programming and has obtained contracts from independent companies and Michigan State University to develop curriculum materials, computer assisted instruction, and other special software.

195 Moyles, L. C., & Newell, J. (1982). Microcomputers in a postsecondary curriculum. *Academic Therapy*, *18*(2), 149-155.

Describes computer use for learning disabled adults in the Learning Skills Program at Cabrillo College, a two-year community college in Aptos, California. Computers are used as teaching tools and for drill and practice, reinforcement of previously presented materials, testing, and program management. Integration of computers into the program was successful because of extensive inservice training in: (1) use of microcomputers as a teaching tool for learning disabled adults, (2) integration of software into the existing curriculum, and (3) adaptation of the software to various disabilities and learning styles. Guidelines for selecting software for older adolescents and adults included questioning the use of graphics, rate of presentation, readability, and ease of operation. Adaptations (peripherals) for special needs used in this program include the ECHO Text Talker or "Voice Card," the Optacon, and the software program "Supertalker," which allows for simultaneous visual and auditory presentation.

196 Muller, J. (1983). The million dollar smile. *The Computing Teacher*, *10*(6), 20-22.

Presents various ways in which microcomputers and Logo computer language have been used with handicapped children. The original version of Logo has been modified to accept single keystroke input so that physically impaired children can interact with it to utilize either the list processing or the graphics capabilities. Voice recognition input procedures can be programmed to accept input of any consistent sounds to accommodate nonvocal users. For example, a tapping sound, finger snapping, piano note, etc., can be programmed as acceptable input. In addition, Logo is also facilitative to learning disabled students. Interacting with Logo has been successful in assisting them to develop analytical skills and increasing their confidence and self-esteem.

197 Murray, K. E. (Project Director) (1983-1986). *Leadership training for administrators of special education in emerging technology*. (California Department of Education, Office of Special Education, 721 Capitol Mall, Sixth Floor, Sacramento, California, 95814; (916) 323-4783) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop an inservice training program in computer use in special education. The program will be used to acquaint special education administrators with the developing technology and its applications.

198 Myers, W. (1982). Personal computers aid the handicapped. *IEEE Micro*, *2*(1), 27-39.

Reviews the needs of handicapped computer users and describes several systems designed to meet those needs. These systems, entered in the Johns Hopkins First National Search for Application of Personal Computing to Aid the Handicapped, are specifically designed for blind, deaf, and both vocal and nonvocal movement handicapped individuals. Entries in the visually impaired categories included reading machines, talking terminals, and braille systems. Systems for the deaf included ways to improve telephone communication, handsigning, lip-reading training, vocalization training, and alarm systems. Entries for the movement-handicapped are divided into two groups (i.e., vocal and nonvocal). For the vocal handicapped, entries include aids for activating control devices such as switches and knobs, wheelchair controls, and voice-recognition controls. Entries for the nonvocal movement-handicapped included eye-tracking devices, menu-basis computer programs, and dynamic matrix scanning and selection.

199 Naiman, A. (1983). Computers and children with special needs. *PTA Today*, *8*(6), 21-22.

or

Naiman, A. (1983). Computers and children with special needs. *The Exceptional Parent*, *13*(3), 13-17.

Reports recent computer technology which is designed to meet the specific needs of different handicapping conditions. Three kinds of overlapping computer applications are discussed. The applications are: (1) the special-purpose application, which is designed for particular physical handicaps; (2) general equipment applications, which can be easily modified for particular handicaps but using standard hardware; and (3) software designed specifically for learners with physical, emotional, or cognitive handicaps.

200 Narita, S. (1983). *An investigation of a relationship between educational philosophies and attitudes toward computer-managed and computer-assisted instruction in secondary regular and special education teachers*. Unpublished doctoral disseration, University of Wisconsin, Madison.

This study investigated the relationship between educational philosophies of progressivism and traditionalism and attitudes towards computer-managed and computer-assisted instruction. Attitudes of teachers

201

were assessed by the Attitude Toward Computer Scale. The major findings are: (1) there is a positive relationship between educational orientations and attitudes toward computer-managed and computer-assisted instruction in special education teachers; (2) special educators with more progressive orientations in education find computer-based instruction useful, (3) the number of computer-course credits is a good predictor of attitudes towards computer usage in education, and (4) there is no significant correlation between educational philosophies and educational experience on attitudes towards computer technologies.

201 *National conference and training workshop on technology in special education* (1984). Reno, NV: Council for Exceptional Children (CEC) and the Council of Administrators of Special Education Incorporated (CASE).

Fifty-three conference presentations are available on cassette tape. A sample of presentation and tape cassette titles are: (1) "Utilization of Microcomputer Technology by the Visually Handicapped User," (2) "Access to Computers for the Severely Physically Handicapped," (3) "Training Special Educators to Use Microcomputer Technology in Educating the Handicapped," (4) "Computers and Counseling in Special Education," (5) "Microcomputer Special Education Data Management System," and (6) "The Direct Instruction Educational Model: Hardware and Software Applications." These and the remaining recorded presentations are available from Cassette Productions Unlimited, 46 South DeLacey Street, Suite 24, Pasadena, California, 91105; (213) 449-0893.

202 *National Easter Seal Society* (NESS), 2023 West Ogden Avenue, Chicago, Illinois, 60612; (312) 243-8400.

NESS is an organization assisting handicapped individuals through programs, agencies, and dissemination of information. The *Computer Disability News: The Computer Resource Quarterly for People with Disabilities* is a free publication available upon request. The newsletter lists programs, products, publications, and conferences.

203 Natural partners: Technology and special education (Special Issue) (1984). *Electronic Learning*, *3*(5).

Presents a series of three articles about how microcomputers are helping educators teach basic skills to handicapped students and manage the paperwork required by federal and state regulations. The first article concerns a cerebral palsied youth who was taught shapes and colors through the use of the computer and an adaptive game paddle. The appropriate software package allowed him to learn in one half-hour session what might have taken months for him to learn with traditional methods. The second article discusses IEP development and data management programs. A chart listing 10 IEP packages includes information about hardware/student capacity, functions, P.L. 94-142 compliance, adaptability, primary user, and security of the systems. The third article profiles the Louisiana's Network of Special Education Records (LANSER), a tracking and data management system.

204 Nave, G. (1985). Learning by interactive video education (LIVE): A project to teach community adjustment skills to mildly mentally handicapped individuals. In M. Gergen and D. Hagen (Eds.), Computer Technology for the Handicapped (Proceedings from the 1984 Closing the Gap conference, Hutchinson, Minnesota) (pp. 63-66).

Introduces the concept of the active user of computer assisted video instruction (CAVI) exercising control over video presentations. Presented is a description of the hardware system and the software needed for this type of instruction. Specifically discussed is CAVI development for the mentally retarded. Described is a five-year project at the University of Oregon Rehabilitation Research and Training Center in Mental Retardation, which is developing courseware that teaches personal enhancement skills necessary for successful transition into the community. Requesting assistance or asking for help is identified as such a skill needed at home, at work, and in the community. The curriculum includes sections on who, when, and how to ask for help, as well as a teacher's manual that outlines role playing activities and homework assignments.

205 Nave, G., & Browning, P. (in press). Computerized education for the developmentally disabled. In J. Wortis (Ed.), Mental retardation review. New York: Elsevier Publishers.

The purpose of this chapter is to present an overview of current educational uses of computers with the developmentally disabled. Two models are used to provide the reader a framework for considering these many and varied applications. The first model gives a broad perspective of the computer for the handicapped. Educational categories discussed are student instruction, teacher instruction, and management. The second model focuses on three major educational modes of using the computer: (1) as a direct teacher to the student (tutor), (2) as an aid for the student (tool), and (3) as a means of engaging in exploratory learning by the student (tutee). Applications for the developmentally disabled are discussed with primary attention given to the instruction mode of computer as tutor. Also included are citations of programs, projects, and research on computer assisted instruction (drill and practice, tutorial, simulation, and educational games) and computer assisted video instruction.

206 Nave, G., & Browning, P. (1983). Preparing rehabilitation leaders for the computer age. Rehabilitation Counseling Bulletin, 26(5), 364-367.

Computer technology has become increasingly important in the lives of handicapped persons and in the work world of rehabilitation professionals. This article is intended to encourage rehabilitation educators to take a major role in preparing future leaders to interface with this technology. An introductory curriculum consisting of two courses is presented as one step in this direction.

207 Nave, G., Browning, P., & Carter, J. (1983). Computer technology for the handicapped in special education and rehabilitation: A resource guide. Eugene, OR: University of Oregon, International Council for Computers in Education.

This is a companion to Resource Guide II. It also provides a means for interested persons to become informed about the newly emerging computer technology and its potential for improving the lives of physically and developmentally disabled individuals. It is a comprehensive bibliography comprised of 191 annotated references on computers for handicapped persons. The references, over half of which have been published since 1980, were drawn from more than 60 different periodicals, books, monographs, reports, and conference proceedings. A detailed description narrative is provided for each reference. As reflected in the subject index, the materials cover a wide range of topical areas (e.g., Computer Assisted Instruction, Functional Aids, Microcomputer Application, Service Delivery, Management, and Research). These and other major content headings are further subdivided. For example, subsumed under the Disability/Handicap heading are the subcategories of autism, cerebral palsy, deaf, developmentally disabled, emotionally handicapped, learning disabled, minimally brain damaged, mentally retarded, nonvocal, physical/general, quadriplegic, and severely disabled.

208 Nelson, P., Korba, L., Park, G., & Crabtree, D. (1983). The MOD keyboard. IEEE Micro, 3(4), 7-17.

Describes problems handicapped computer users may have in manipulating a standard computer keyboard. Previous solutions have included modifying software to accommodate access. The authors describe a system which uses a second peripheral computer, which is interposed between the user's control device, or actuator, and the host computer (the computer to be used). A typical system is shown, which uses a MOD (mouth-operated dynamic) keyboard emulator, developed by the National Research Council of Canada, controlling an Apple II. A Commodore VIC-20 has been found to be the most appropriate for implementing the keyboard emulator, largely because of its provision for plug-in program cartridges. The VIC-20 also has a game controller input port, which accepts switched joysticks, analog paddles, and light pens. Schematic diagrams for designing the MOD as a plug-in cartridge are shown, along with descriptions of software design, system configuration, and connection to the host computer. Transparent access, dynamic keyboard displays, and user-definable word/phrase pages are described as the main advantages of this system.

209 New voices: Communication through technology (1983). The Exceptional Parent, 13(3), 18-25.

Presented are the various means by which handicapped persons can communicate with their world via computer technology. The wide range of communication technology is allowing for improved matching of special communication systems to specific handicapping conditions. Synthesized voice modules, electronic computer communication boards, keyboards or membrane squares, and picture/word video screens are just a few examples of computer communication technology. Some systems allow for control by touch, muscle movement, light beam interruption, or sound. Furthermore, some voice recognition systems enable the user to compile a sound dictionary where certain sounds represent full words which can then be either printed out or spoken via a synthesized voice.

210 Newman, S. S. (Project Director) (1983-1984). *Feasibility study on the development of a computer-based course for special education teachers.* (Planning Systems International, Inc. (PSI), 200 Little Falls Street, Suite 104, Falls Church, Virginia, 22046; (703) 534-7591) Grant awarded from the U.S. Department of Education.

This project is designed to develop a five- to ten-hour training course for special education instructors in using an authoring language in developing special education CAI software. The project will also include gathering data on teacher's attitudes toward computer use in instruction and their ability to develop CAI and finalization of the complete teaching course.

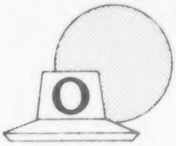
211 Nicholson, M. (1983). The librarian and special education--computers bring us together. *The Computing Teacher*, *10*(6), 47-48.

Describes the ways in which microcomputers in a school library have assisted in meeting the needs of special educators and their students. In order to determine the nature of the student's needs, this librarian spent time observing the children in their classrooms. This step was necessary to provide insight into special education learning needs so that appropriate software could be purchased. In addition, eighth grade computer programming classes were enlisted to develop software for these special students. Additionally, a data base program has been acquired which stores an electronic portfolio consisting of student information, test scores, and Individualized Education Plan (IEP) data and review dates.

212 Nugent, G. C. & Stepp, R. E., Jr. (1984). The potential of videodisc technology for the hearing impaired. *Exceptional Education Quarterly*, *4*(4), 104-113.

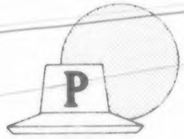
Defines videodiscs and lists their advantages and disadvantages for the education of the hearing impaired. The advantages include: (1) flexibilitly in presentation of instructional materials; (2) random access to any of the 54,000 individual frames per disc side; (3) presentation of all other media forms for multimedia learning experiences; (4) high degree of visual stimulation, which is critical in the education of the deaf; and (5) individualization of instruction. Random access can be conducted by the teacher, parent, or student and is emphasized in the education of the deaf, where large variation in learning styles, levels, and capabilities of students exist. The two major disadvantages discussed are that few discs have been developed for the hearing impaired and they are expensive.

Descriptions are given of several videodisc programs produced by the Media Development Project for the Hearing Impaired, a federally funded project at the University of Nebraska, Lincoln. Finally, future uses of videodiscs in deaf education are offered.



213 O'Leary, J. P., & O'Reagan, J. R. (Eds.) (1982). *Proceedings of the Fifth Annual Conference on Rehabilitation Engineering*. Houston, TX: Rehabilitation Engineering Society of North America.

The theme of this conference was "Technology Utilization: The Key to Independence." Over 100 scientific papers are included dealing with communication technology, systems, and devices for daily living, service delivery, computer applications, assistive devices, work site and vocational rehabilitation, biomechanics and measurements, seating and posture control, interfaces and biofeedback, wheelchairs and mobility, and aids for people with sensory impairments. Also included is a section of 15 papers representing the entries in the student design competition. Copies of this proceeding as well as those of other years are available for purchase from the Rehabilitation Engineering Society of North America, 4405 East-West Highway, Bethesda, Maryland, 20814.



214 Palmer, J. T. (1984). Technology, career development, and special needs students. *Career Development for Exceptional Individuals*, *7*, 3-11.

Describes technology for special education in three categories: (1) computer assisted instruction, which capitalizes largely on the popularity of arcade-style games; (2) computer managed instruction, which aids the instructor and staff in administering and tracking student education; and (3) computer support activities. The author suggests that research findings indicate that the use of technology in special education is here to stay because it works and is attractive to students. The implications for use of technology to further career preparation of disabled persons are discussed.

215 Personal computers and the disabled: A resource guide. Apple Computer Inc., 20525 Mariani Avenue, Cupertino, California, 95014.

Introduces personal computer products and applications for the disabled through a series of articles. Featured are personal cases where the deaf have benefited from programming, word processing, computer assisted instruction (CAI), and telecommunications. A lesson development system called "BLOCKS '82" and a graphics program called "Edu-Paint" allow teachers to create appropriate CAI lessons for the deaf. Innovative developments cited for the blind include: (1) a text editing and translating program called "Braille-Edit;" (2) "NUMBERS," a mathematics program that translated mathematical expressions including fractions, Greek letters, integral signs, etc., into readable text formulas and equations that can be printed on a dot matrix printer; and (3) a "Musical language" that provides auditory feedback allowing blind users to detect spelling errors as a result of dissonant note combinations. Using CAI with learning disabilities students reinforces spelling, math, and reading, as well as small motor coordination, critical thinking, and concept building. Cerebral palsied individuals, with limited motor and speech skills, outline the differences computers have made in their lives (e.g., programming as a career in communications, recreational opportunities). The Resource Guide includes a descriptive comprehensive list of hardware and software products, organizations, and additional resource materials.

216 Philips, S. (Project Director) (1983-1984). A project to make Apple computers accessible to blind children. (Sensory Aids Foundation, 399 Sherman Avenue, Suite 12, Palo Alto, California, 94306; (415) 329-0430) Grant awarded from the U.S. Department of Education.

The purpose of this project is to provide educational software through equipment adaptation to facilitate computer access for blind students.

217 Pickett, J. M. (1981). Speech technology and communication for the hearing impaired. Volta Review, 83(5), 301-309.

Reviews new developments and suggests areas for further development in (1) speech communication aids for the deaf, such as speech made visible by microprocessors that feed signals to monitors, tactile speech translators, or speech movement indicators; (2) electo-auditory implants for hearing; and (3) speech computing, which is described in five areas: (a) artificial speech and speech recognition systems such as HandiVoice and the Autocuer, (b) processing speech of the deaf for intelligibility, (c) computer modeling of articulation movements, (d) speech signal enhancement for hearing aids, and (e) computer-processed speech for hearing diagnosis.

218 Pollard, J. P. (1984). Adaptive devices for special education. Electronic Learning, 3(5), 44-46.

Summarizes three adaptive devices which allow physically disabled, blind, and deaf students to participate in classroom activities with normal children. The three devices discussed are: (1) the Adaptive Firmware card for the physically disabled, (2) the Optacon print reading system for the blind, and (3) the TeleCaption decoder for the deaf. The manufacturers and prices are also listed.

219 Powers, J., & Ball, T. S. (1983). Video games to augment leisure programming in a state hospital for developmentally disabled clients. *Journal of Special Education Technology*, *6*(1), 48-57.

Developmentally disabled persons frequently have large amounts of leisure time and insufficient or inappropriate activities to fill that time. This study examines three long-term male residents in a living unit of Fairview State Hospital, Costa Mesa, California. All three subjects were trained to play the Unisonic Tournament 2000 pong video game. Results in areas such as score improvement, cooperation, competition, social interaction, and cognitive and sensori-motor development are noted. The video game format is suggested for (1) researching the efficacy of mouth-controlled and other adaptive switches, (2) evaluating interactive values of doubles play, and (3) studying the intrinsic stimulation of games.

220 Prinz, P. (Project Director) (1983-1984). *Early reading and writing in young deaf children using microcomputer technology*. (Pennsylvania State University, Division of Special Education and Communication Disorders, 207 Old Main, University Park, Pennsylvania, 16802; (814) 863-2018) Grant awarded from the U.S. Department of Education.

The purpose of this project is to further expand a pilot study that uses computer assisted instruction to teach reading to deaf children ages two to six years. The project also provides for systematic evaluation of the program's success.

221 Prinz, P. (Project Director) (1984-1985). *A child-computer-teacher instruction method for teaching early reading and writing to hearing-impaired children*. (Pennsylvania State University, Division of Special Education and Communication Disorders, 207 Old Main, University Park, Pennsylvania, 16802; (814) 863-2018) Grant awarded from the U.S. Department of Education.

The purposes of this project are to: (1) compare traditional methods of teaching reading to hearing impaired students (ages 3 - 10) with such instruction accompanied by CAI, (2) assess the use of interactive computer learning on communication development in the hearing-impaired, and (3) describe the correlation between instruction time on the computer and development of reading and communication skills. The microcomputer being used includes a special interface keyboard that provides students with instant access to many printed words and accompanying graphics.

222 Proceedings of the First Special Education Technology Research and Development Symposium (1984). Washington, D.C.: National Association of State Directors of Special Education.

This document, including a background paper on technology trends, a synopsis of the five presentations, and the five papers presented during the symposium, provides an overview of the state of the art of Research and Development efforts in special education technology. Included are the following titles: (1) "Technology Trends in Special Education," (2) "Issues and Problems in Devising a Research Agenda for Special Education and Technology," (3) "Macro-Research on Technology: Micro-Research on Education," (4) "An Overview of Intelligent CAI Systems," (5) "Expert Systems: Their Potential Roles Within Education," and (6) "Robots and Special Education: The Robot as Extension of Self."

223 Proceedings of the Johns Hopkins First National Search for Applications of Personal Computing to Aid the Handicapped (1981). The Institute of Electrical and Electronics Engineers, Inc., Order from IEEE Computer Society, P.O. Box 80452, Worldwide Postal Center, Los Angeles, California, 90080.

This 303 page book contains abstracts of 97 top regional entries in the national search for new applications of microcomputers to aid handicapped persons. The abstracts are organized into five sections by handicap category, although many entries have potential application across several handicapping conditions. The sections are: (1) hearing, speech, and language; (2) learning disabilities and mental retardation; (3) movement, neuromuscular, and neurological; (4) vision; and (5) nonspecified. A list of regional prize winners and an author index are also included. The competition was co-sponsored by Radio Shack, Johns Hopkins University, and the National Science Foundation.

224 Project EduTech. JWK International Corporation, 7617 Little River Turnpike, Annandale, Virginia, 22003.

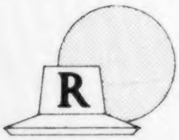
Project EduTech is designed to provide technical assistance to state and local education agencies in the appropriate use of technology in special education. Ongoing activities include selecting widespread special education issues on which to focus each year, writing reports, resource guides, and annotated bibliographies in order to disseminate information on technological advances that may resolve these issues. A computer-based technology series includes titles on management information systems; computer managed instruction; audio, video, and computer conferencing; closed captioning; and teletext and videotext. Annotated bibliographies are available on a broad range of topics (e.g., software, assistive/communication devices, associations, hearing impaired, instructional applications, Logo, planning for computer use, and microcomputers and special education: a resource guide for parents). All materials are available at no charge and can be copied for further dissemination. Inquiries should be made to the above address for further information about products and resources available.

225 Project TEECH (Newsletter). Special Education Program, University of California, Santa Barbara, California, 93106.

This newsletter reports the progress of research on the effectiveness of microcomputers for mildly handicapped pupils being conducted at the University of California, Santa Barbara. The newsletter is sent to teachers and administrators in schools participating in the project. It is also available to other interested persons in the use of microcomputers with mildly handicapped learners.

226 Propp, G., Nugent, G., Stone, C., & Nugent, R. (1981). Videodisc for the hearing impaired. Volta Review, 83(5), 321-327.

Focuses on the use of the videodisc with the hearing impaired. RCA's capacitance system is summarized and the optical videodisc is detailed. The educational advantages of the optical videodisc are: (1) a broad range of audiovisual materials (i.e., filmstrips, audiotapes, still and motion picutres) can be stored on a single disc; and (2) the material is easily accessed by the teacher or trainer. Several videodisc programs produced and tested by the Media Development Project for the Hearing Impaired at the University of Nebraska are also described.



227 Reece, H. F. (1982). Computers, learning styles, and instructional materials--are they related? Academic Therapy, 18(2), 157-161.

The Cuyahoga Special Education Service Center's computer use in organizing resource material for special education instruction is presented. The steps included for organizing resources are: (1) identifying all materials according to four defined variables, (2) locating a suitable data base program, and (3) acquainting teachers with the system. The teachers can then receive a print-out of materials that correspond to the educational goals specified. The system has been evaluated as valuable to monitoring and ordering resource materials, as a time-saving device for teachers, and as an effective means for pinpointing needs and materials available for individual students.

228 Rehabilitation Engineering Society of North America (RESNA). 4405 East-West Highway, Bethesda, Maryland, 20814; (301) 657-4142.

RESNA is an organization open to all persons who are interested and involved in the development and delivery of functional aids and other equipment for disabled persons. RESNA publishes a quarterly newsletter and sponsors an annual conference on rehabilitation engineering. Activities and programs help to promote the application of appropriate technology for the benefit of those who are disabled.

229 Reiss, L. K. (1982). Using computers to assist learning disabled high school students. Unpublished paper, Ottawa Board of Education, High School of Commerce, 300 Rochester Street, Ottawa KIR-7N4, Ontario, Canada.

Reports the use of computer technology for instruction with learning disabled high school students. The main topics are: (1) where computers are being used to assist learning disabled students, (2) analysis of software suitable for instruction of learning disabled students, (3) applications of computers for instruction, and (4) a view of the potential for computers in special education.

230 Rettig, M. (Project Director) (1983-1984). An investigation of the influence of four different computer response modes on the accuracy and frequency of responding by preschool-aged handicapped children. (University of Kansas, Special Education Department, Haworth Hall, Lawrence, Kansas, 66045; (913) 864-4942) Grant awarded from the U.S. Department of Education.

The purpose of this project is to examine four different methods of responding to the computer. The methods of responding include the keyboard, a keyboard adaptation, the light pen, and the paddle. The differential effects of these four modes in terms of frequency and accuracy of response by preschool handicapped children will be examined.

231 Richardson, J. (1981). Computer assisted instruction for the hearing impaired. Volta Review, 83(5), 328-335.

Identifies four basic approaches for computer assisted instruction (CAI) in programs for the hearing impaired. These four approaches are: (1) large scale, time-shared, dedicated systems such as PLATO; (2) intermediate-to-small-scale time-shared systems such as TICCIT and CCC; (3) small-scale special purpose systems such as DAVID; and (4) general purpose microcomputers such as the PET, Apple, and TRS 80. Research on the four approaches is summarized. The author notes how CAI was introduced 20 years ago and that research has shown it to be a significant benefit for hearing-impaired students. Authoring systems are also discussed as a way to reduce developmental costs and involve instructional personnel in the design of lesson materials.

232 Rieth, H. (Project Director) (1980-1983). Evaluating and providing feedback on the effectiveness of instruction for handicapped children integrated in inner-city secondary schools. (Indiana University, Center for Innovation in Teaching the Handicapped, School of Education, 2805 East 10th Street, Bloomington, Indiana, 47401; (812) 335-5845) Grant awarded from the U.S. Department of Education.

The purpose of this project is to produce a data management and information system for use by teachers and resource educators working with mildly handicapped high school students. The system collects individual student data for instructional planning and cumulative data for administrative decision-making. Teacher use of the microcomputer will be investigated to determine how often teachers access student data bases and how much time teachers spend using the computer.

233 Rieth, H. (Project Director) (1983-1987). Instructional and contextual variables in efficacy of computer-based instruction for mildly handicapped secondary students. (Indiana University Foundation, P.O. Box 1847, Bloomington, Indiana, 47403; (812) 337-5845) Grant awarded from the U.S. Department of Education.

The purpose of this project is to: (1) analyze the impact of computer-based instruction on the academic achievement and amount of academic learning time provided to mildly handicapped secondary students, (2) measure both qualitatively and quantitatively and contextual and intrapersonal variables that may effect implementation of microcomputer-based instruction, (3) analyze experimentally some interventions designed to increase the efficacy of microcomputer-based instruction for this group, and (4) develop instructional packages and software that will enable a number of audiences to use the key findings in developing and using instructional programs for mildly handicapped students.

234 Rieth, H. (Project Director) (1983-1986). A microcomputer based special teacher education and evaluation laboratory. (Indiana University, School of Education, Center for Innovation in Training the Handicapped, 2805 East 10th Street, Bloomington, Indiana, 47405; (812) 337-5847) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop and operate a Special Teacher Education and Evaluation Laboratory (STEEL) at Indiana University. The STEEL uses microcomputers in: (1) discrimination training on instructional and behavioral management methods using a microcomputer videotape interface system, (2) hardware and software for CMI with preservice teachers, (3) training in computer literacy for teachers, and (4) development of a CMI system to enhance quality control of student programs at Indiana University.

235 Rieth, H., Polsgrove, L., & Eckert, R. (1984). A computer-based spelling program. Academic Therapy, 20(1), 59-65.

Discusses research on difficulties learning disabled children experience with traditional spelling books, major characteristics of effective remedial spelling programs, and a direct instructional model for maximizing student achievement in regular and special education environments. The authors also discuss microcomputers as a spelling instruction tool and review SPELLMASTER, an individualized spelling instruction and instruction management software package designed by the Center for Innovation in Teaching the Handicapped. SPELLMASTER (for use on Radio Shack Model 1, 3, or 4 computer, with or without Vortrax Type 'N' Talk speech synthesizer) presents teacher specified spelling lists to students and records answers. A second component allows teachers to create and edit individual lists and monitor results.

236 Roberts, F. C. (1984). An overview of intelligent CAI systems. In Proceedings of the First Special Education Technology Research and Development Symposium (pp. 66-78). Washington, D.C.: National Association of State Directors of Special Education.

Defines Artificial Intelligence (AI) as an interdisciplinary field of computer science, psychology, and linguistics attempting to get computers to perform tasks that if performed by a human being would require intelligence. Recent application of AI principles is seen in the areas of vision processing, speech understanding and generation, robotics, and expert problem-solving systems. Instructional system applications are referred to as intelligent tutoring systems or intelligent computer assisted instruction (ICAI). ICAI resembles the one-to-one teaching situation between teacher and student. The three necessary instructional components are: (1) a content to be taught, (2) a method for teaching the content, and (3) an understanding of the student who is being taught. ICAI systems provide a framework for separating and interacting with each of these components using a mixed-initiative dialogue in a natural language environment. The author's opinion is that this idealized system may be actualized in 15 to 20 years. Presently, only parts of AI are in the stage of successful research and development.

237 Roehl, J. E. (Ed.) (1984). Proceedings of Discovery '83: Computers for the Disabled. Menomonie, WI: Materials Development Center, Stout Vocational Rehabilitation Institute, University of Wisconsin-Stout.

Contains 30 papers presented at a national conference on the use of computers in special education and rehabilitation. Some of the titles included are: (1) "The Use of Computers in Rehabilitation Facilities," (2) "Microcomputers and Employment for the Disabled the CHPI Experience," (3) Adapting Computer Equipment for Handicapped Children: A Review of Current Strategies and a Report of a Project," (4) "Integrating CAI with Traditional Instruction in Elementary Classrooms," (5) "Braille-Edit: A Versatile Tool for the Blind and Sighted," and (6) "Using the Computer in the Special Education Classroom: The Possibilities and the Courseware."

238 Rosenberg, M. S., & Sindelar, P. T. (1981). Computer-assisted data management of instructional programming. *Education Unlimited*, *3*(3), 37-40.

Reviews research findings in the area of data utilization and computer managed instruction (CMI). The authors concend that a CMI system can assist the effectiveness of a Data Based Program Modification (DBPM) methodology by providing ease of administration, time efficiency for systematic data collection, and utilization and retrieval. Features of a DBPM-CMI system include: (1) data storage, (2) report generation, (3) detailed performance assessment results, (4) feedback, and (5) immediate retrieval of charted data. Three major implications of a CMI-DBPM approach are presented. First, the amount of record keeping time saved by teachers allows for more direct instruction time. Second, it allows for continuous monitoring of instructional objectives and printed documentation for student records and IEPs. Finally, a low cost system lets school districts gain more accountable and effective service from their teachers while increasing student skill performance. Results look positive but there is a need for more research to fully evaluate the gains of a CMI-DBPM system.

239 Rosenburg, S. (Project Director) (1983-1984). *Development of a microprocessor-based work station for severely and profoundly multi-handicapped students*. (University of Nebraska, Omaha, Counseling and Special Education, Omaha, Nebraska, 68182; (402) 554-2201) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a computer-based work station which will present students with activities in cause-and-effect relationships and to signal adults for attention. Performance data and skills acquisition data will be collected for modification and evaluation.

240 Rostron, A., & Lovett, S. (1981). A new outlook with the computer. *Special Education: Forward Trends*, *8*(4), 29-31.

Describes a study conducted at Hull University where specifically designed electromechanical and computer based aids helped to modify the environment of 10 nonambulatory, profoundly mentally retarded, multihandicapped children in Great Britain. The goal was to enable the child to successfully interact with his/her surroundings. Three of the several devices produced are described. The first is a simple untrasonic switch which can be connected to a radio, TV, slide projector, light bulb, bell, or tape recorder. The equipment is activated by breaking the ultrasonic beam by moving any part of the body. Second, the three types of switches desribed are a pressure pad switch, a mercury switch, and a gear lever switch. The third device developed was a battery operated car activated by breaking the ultrasonic beam or using one of the three switches. Results indicate that learning did take place and that the children became more active and smiled and vocalized more when operating the devices.

241 Rostron,, A., & Sewell, D. (1984). Microtechnology in Special Education. Baltimore, MD: Johns Hopkins University Press.

Assesses the current status and surveys the future prospects of microtechnology in the field of special education. The book discusses the specific problems of educating the prelingually or profoundly deaf, the physically handicapped, and the mentally retarded. The authors show throughout the book how the gains can be maximized if the new applications of microtechnology are placed within the framework of developmental psychology. The use of technology can create novel environments in which communication skills can be more easily learned. Described are specially developed software programs and potential uses of computer games for teaching handicapped children. Suggestions also are included on how to combine teaching methods with technology to generate approaches that are superior to individual elements in isolation.

243 Rubinstein, R., & Rollins, A. (1978). Demonstration of Use of Computer Assisted Instruction with Handicapped Children (Final Report No. 4049). Washington, D.C.: Office of Education.

Reports the findings of a two year experiment to demonstrate the utility of a computer aided educational environment for deaf children. The subjects had severe deficiencies in language and math resulting from their primary handicapping condition of deafness. It was these specific areas that were stressed in the computer lessons of which examples are given. The experimental design for evaluation of the project consisted of four approaches: (1) an interrupted time series design, (2) an analysis of changes in performance during the course of CAI, (3) a comparison of performance levels before and after similar tests at a control school, and (4) a teacher evaluation of the CAI system.

244 Ruconich, S. K. (1984). Evaluating microcomputer access technology for use by visually impaired students. Education of the Visually Handicapped, 15(4), 119-125.

or

Ruconich, S. K. (1984). Evaluating microcomputer access technology for use by visually impaired students. The Pointer, 28(2), 44-47.

Outlines the advantages and limitations of each generic type of microcomputer access technology available for the visually impaired. The information is intended to assist professionals, students, and others to make more informed choices to meet their needs. The devices discussed are: (1) electronic braille, (2) paper braille, (3) optacon, (4) synthesized speech, and (5) enlarged print.

245 Ruconich, S. K., Ashcroft, S. C., & Young, M. F. (1984). Making microcomputers accessible to blind persons. Exceptional Education Quarterly, 4(4), 9-23.

Explores tactile, auditory, and visual means of access to microcomputers for the blind. Described are the advantages and limitations of electronic braille, paper braille, OPTACON, synthesized speech, and enlarged print. The authors suggest that relevant factors which should be considered before choosing an access mode include: (1) the cost-benefit ratio, (2) portability, (3) user speed, and (4) the user's capabilities and preferences. Access technology for the visually impaired now exists and is expected to gain in availability and variety. It is then the educators' task to facilitate computer access and computer literacy for the visually impaired.

246 Rude-Parkins, C. (1983). Microcomputers and learning disabled adolescents. The Pointer, 27(4), 14-19.

Provides a basic description of types of computer assisted instruction (CAI) and computer managed instruction (CMI). CAI for learning disabled adolescents is discussed in terms of effectiveness, efficiency, impact on learning outcomes, and special needs. Specific and creative uses of CAI are discussed for academic skill development (i.e., intensive remediation of basic skills) and cognitive skill development (i.e., learning strategies, problem-solving skills, and motivation). Teacher-developed software using authoring systems is described. The author concludes by stating that sound instructional design and well thought out content are the keys to developing good software.

247 Rushakoff, G. E. (1984). A clinician's model for the review of speech, language and hearing microcomputer software. ASHA, 26(8), 43-44.

The purpose of this article is to delineate the 10 major decision-making factors for the use of microcomputers in the fields of speech, language, and hearing. The author suggests that before purchasing software programs and materials that clinicians need to address the following questions: (1) is there a clear purpose/objective to the program?, (2) does the objective meet the specific need?, (3) is there evidence that the program accomplishes it's objectives?, (4) is it easy and clear to use?, (5) documentation?, (6) is there a source for additional help and information?, (7) is there a return policy?, (8) can the program be copied?, (9) does it require nonstandard peripheral equipment?, and (10) is the program cost-effective?

248 Rushakoff, G. E., & Lombardino, L. J. (1983). Comprehensive microcomputer applications for severley physically handicapped children. Teaching Exceptional Children, 16(1), 18-22.

Presents a discussion regarding the application of microcomputers with severely physically disabled persons. Keyboard adaptations include software, hardware, and firmware based single and multiple switch control, keyguard devices for standard keyboards, and expanded keyboards. Common applications of microcomputers with this population consist of speech output communication aids, academic instruction (CAI), word processing to assist in the production of written material, creative arts software (music composition and graphic drawing), recreational software (games of strategy, logic, and memory), and vocational opportunities via instruction in computer programming. Performance and environmental factors to be considered prior to selecting a microcomputer as a living aid are defined so that individual needs are met to the fullest extent.

249 Rushakoff, G. E., & Lombardino, L. J. (1984). Microcomputer applications. ASHA, 26(6).

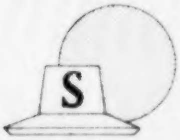
The purpose of this article was to survey the use of microcomputers in university speech-language and hearing programs and to design and implement an introductory course for instruction in the daily application of microcomputers for speech-language and hearing clinicians. Surveys were mailed to 88 member universities of the National Council of Graduate Programs in Speech and Language Pathology and Audidology that were listed in the 1970-80 council directory. The survey included a questionnaire on present computer usage and a proposed course outline. Sixty-three percent of the representatives responded. The results of the survey indicate that 41% of the respondents had at least one microcomputer, primarily used for word processing, clinic client records and student clock hours, and that a course dealing with the daily application of microcomputers in speech-language and hearing for clinicians would be highly pertinent and useful.

250 Russell, S. J. (1983). Had we but world enough and time: Logo in special education. Classroom Computer Learning, 4(3), 34-39.

Discusses the microcomputer as a potentially powerful tool for creating more worlds and time for special education students. The author states that using computers to increase learning time for special education students rests on four dubious assumptions: (1) repetition increases learning; (2) knowledge is hierarchical and can be broken into unalterable sequences of learning bits; (3) special needs children cannot be trusted to invent problems of their own, because they only have time to solve problems that teachers give them; and (4) special needs children are slower thinkers and learners. She suggests that what is actually needed is the view of more worlds that allow for individual styles and paces of learning. Computers, particularly the use of Logo, are presented as offering engaging content for students and providing teachers with new capabilities of interacting with children's thinking. The author worked on a Logo project with six-to-ten-year-old physically handicapped and/or disabled children, and presents several case studies to substantiate her beliefs. The author's criterion for determining appropriate uses of computers in the special education classroom are also reported. The four criteria are: (1) provide motivation through intellectually compelling content, (2) provide a means of communication, (3) reveal hidden learning strengths, and (4) empower children to be in control of their own learning.

251 Ryder, A., Cox, L. S., & Tilley, B. K. (1983). Technical specifications for adapting Apple microcomputers for use by students with severe physical disabilities. Education Technology, 23(9), 20-21.

Discusses ways in which microcomputer equipment must be modified so that physically disabled students can input responses. Standard keyboards are ineffective devices for many physically impaired persons as are standard game paddles with rotary dial motion and switches that are too small. Ways in which the above limitations can be adapted include: (1) replacing the standard paddle switch with a larger one, (2) relocating the switch (mount on wheelchair), and (3) replacing the switch with a jack so that various switches can be used with different individuals. The article concludes with instructions and diagrams for building an adapter box for the Apple microcomputer that incorporates a variety of switches.



252 Sandals, L. H. (1973). Computer assisted learning with the developmentally handicapped. Unpublished doctoral dissertation, University of Calgary.

This was a study conducted to determine if computer assisted instruction (CAI) was effective in teaching banking concepts to developmentally disabled young adults. Twelve resident trainees at the Vocational Rehabilitation Research Institute at Calgary participated in the study. Experimental procedures consisted of interspersed assessment and training. Specifically, the subjects were administered the following: six paper/pencil pretests, one computer administered pretest, three CAI programs, posttest #1, three CAI programs, posttest #2, three CAI programs, posttest #s 3 and 4, three CAI programs, posttest #s 5 and 6, and after 2 months, all posttests (1-6) were readministered as retention measures. The two types of assessment measures were concrete and transfer. Concrete tests required individuals to interact with actual banking forms identical to those used in the CAI lessons; transfer tests were similar, although different banking forms were used as testing stimuli. Results indicate that the assessment measures were reliable and that the CAI programs are effective in teaching banking skills to these subjects. Moreover, the content is retained and transfers to other banking forms.

253 Sanford, L. (1984). A formative evaluation of an instructional program designed to teach visually impaired students to use microcomputer. Education of the Visually Handicapped, 15(4), 135-144.

Evaluates the effectiveness of a three-part instructional program designed to teach visually impaired students to use microcomputers. The subjects were a subset of a student group participating in a larger study entitled "Research on Multi-Media Access to Microcomputers for Visually

Impaired Students." The 10 students were 12-18 years old, legally blind, and proficient in reading and writing braille. They received instruction in small groups or individually used the first two modules of the instructional package. The instructional program consists of: (1) module one, which introduces the student to the major components of the Apple II+ computer and enables them to switch the computer on and off and access a program; (2) module two, which teaches the visually impaired students to operate the microcomputer without assistance; and (3) module three, which provides instruction in BASIC programming language. Results show that, when grouped according to age, younger students learned to operate the computer in a shorter time and with fewer trials. The students were able to identify four types of access technology for the visually impaired and were able to locate, name, and describe the components of the access equipment.

254 Saunders, F. A., Hill, W. A., & Easley, T. A. (1978). Development of a PLATO-based curriculum for tactile speech recognition. Educational Technology Systems, 7(1), 19-27.

Describes a PLATO-based curriculum used to teach profoundly deaf children to understand speech as represented by a tactile pattern on the abdomen. A sensory aid, the teletactor, converts PLATO's auditory disk output into a tactile pattern series which is learned as a new language. A PLATO-based curriculum accepts and evaluates student responses during the learning process. The authors indicate that preliminary test results are promising in that the users show high motivation, attention, and learning achievement level.

255 Schiffman, G., Tobin, D., & Buchanan, B. (1982). Microcomputer instruction for the learning disabled. Journal of Learning Disabilities, 15(9), 557-559.

Presented are the advantages of the microcomputer especially for learning-disabled students. The seven advantages discussed are: (1) microcomputers are "friendly"--they can give the child's name and can correct mistakes in a nonthreatening manner; (2) computers give children undivided attention; (3) computer programs will wait for the student to respond without rushing; (4) reinforcement is immediate; (5) drill and practice can be made more interesting through use of sensory or game-playing effects; (6) the amount of teacher-time required to set up discovery learning situations is reduced, making opportunities for these activities more frequent; and (7) problem-solving situations can be created on computers that allow disabled learners to practice skills while the computer effectively hides the answer until the appropriate time. Other examples of microcomputer applications are described along with the Johns Hopkins First National Search for Personal Computing to Aid the Handicapped, a nationwide search conducted in 1980-81. A common attribute of most leading entries in the search was special software uses of personal computer graphics and sound/voice capabilities. Some of the winning entries are cited.

256 Schiffman, G., Tobin, D., & Cassidy-Bronson, S. (1982). Personal computers for the learning disabled. Journal of Learning Disabilities, 15(7), 422-425.

Suggests an interdisciplinary approach to assure technological and computer literacy among educators. Interaction is encouraged between educators and specialists in engineering, computer programming, medicine, speech pathology, occupational and physical therapy, psychology, and the handicapped users. The authors suggest that this interdisciplinary approach is vital if an effective and practical use of computer technology to aid the handicapped is to be achieved. Major impediments to widespread use of computers in education include the scarcity of good educational software, lack of evidence concerning the effectiveness of computer-assisted instruction, and the inherent structural resistance the educational system exhibits toward new and highly touted innovations. Also described is a case study of an urban school's efforts to implement computer-managed and assisted instruction.

257 Schneider, W. (1983). Communicating in code. Creative Computing, 9(10), 222-232.

Discusses the Serial Code Keyboard (a data entry method) which is under development at the Applied Physics Laboratory of the Johns Hopkins University for the Veterans Administration. This method requires only the ability to move a spring-centered three-position switch to either extreme position, producing tone sequences which are used to generate a pseudo Morse code. That code duplicates the function of the standard keyboard and allows upper limb amputees and quadriplegics to have computer access. A case is made for the need of such a system. Detailed are the three Serial Code Keyboard files, which are currently being evaluated in research centers throughout the United States and Canada.

258 Schwartz, A. H. (Ed.) (1984). Handbook of microcomputer applications in communication disorders. San Diego, CA: College-Hill Press.

This comprehensive reference on the applications of microcomputers for communication disorders contains 13 chapters divided into three major sections that: (1) provide detailed information on making decisions about microcomputers; (2) explore current and emerging applications in communication disorders including clinical, research, academic, instruction, and administrative applications; and (3) analyze issues and perspectives needed to understand the use and implications of microcomputers. The handbook also includes a glossary of microcomputer technology.

259 Semancik, S., & Curtis, C. M. (1983). Micros with the handicapped: Developing a communications program. Compute, 5(1), 124-125.

The third in a series of articles regarding a specific home computer program designed to aid in the communication of nonverbal and motor-impaired individuals. The introduction and menu setup are outlined in prior articles. This article details the menu selection process including storage and multiple menu capabilities. Discussed are types of access and displays. Printouts of the computer programs for the Apple, PET, and VIC are listed.

260 Semmel, M. (Project Director) (1983-1987). Analysis and development of naturalistic and experimentally constructed microeducational environments for mildly handicapped learners: A four year program of research. (University of California, Santa Barbara, Graduate School of Education, Special Education Program, Santa Barbara, California, 93104; (805) 961-3477) Grant awarded from the U.S. Department of Education.

The purpose of this project is to conduct a series of studies designed to test the unspoken assumptions and uncritical enthusiasm for microcomputer technology in special education for mildly handicapped students. The two approaches to be incorporated are: (1) surveying pertinent contextual variables in naturalistic, field-study research, in order to describe the factors that contribute to outcomes for mildly handicapped students using microcomputers; and (2) constructing experimental conditions for studying the potential effects of microcomputers under optimal, state of the art conditions without the usual constraints, then specifying what policy arrangements and expenditures would be needed to facilitate the most desirable outcomes.

261 Senf, G. M. (1983). Learning disabilities challenge courseware. The Computer Teacher, 10(6), 18-19.

Presents the microcomputer as a teaching ally for learning disabled students and indicates that problems of computer assisted instruction (CAI) are similar for learning disabled and normal children. The author emphasizes individualization as the biggest problem and challenge in education. He criticizes the use of CAI for dealing with children individually but not as individuals. He also points out that content, timing, and the learning methods used in software are critical for optimizing learning as children perform differently from one specific condition to another.

262 Sewell, D., Clark, R., Phillips, R., & Rostron, A. (1980). Language and the deaf: An interactive microcomputer-based approach. British Journal of Educational Technology, 11(1), 57-68.

Presented are the linguistic problems of deaf children and considerations for providing them with a meaningful language learning environment. The authors discuss the usefulness of computer assisted instruction (CAI) in serving this purpose. Furthermore, a language manipulation software program designed for deaf persons is described and the results and implications of its usage presented.

263 Shanahan, D., & Ryan, A. (1984). A tool for evaluating educational software. Teaching Exceptional Children, 16(4), 242-247.

Describes the Huntington-Commack Software Evaluation Project which published A Teacher's Guide to Educational Software K-12. The guide is designed to assist both regular and special education teachers in integrating computer programs into their curriculum. It is available for $5.00 from Donald Maxim, New York State Association for Educational Data Systems, P.O. Box 78, Yorkshire, New York, 14173. A matrix and evaluation form is included and can be copied for use by classroom teachers. The guide serves as a directory of recommended software that is cross-referenced for subject area, grade, hardware specification, documentation, and content.

264 Shirriff, B. (1980). The microcomputer as a communication device for non-vocal children with limited manual dexterity. Proceedings of the Association for the Development of Computer-Based Instructional Systems. Western Washington University, Bellingham, Washington, 152-156.

Discusses a case in which the needs of a cerebral palsy student with limited manual dexterity and total absence of speech served as the basis for designing an accessible computer keyboard system. Student computer access was facilitated by using a plastic mask to cover the keyboard and avoid accidental keystrokes and a four-position joystick. Three programs were developed to utilize six keys and a space bar on the keyboard. These keys were programmed to represent numbers one through seven. Word and sentence building are the programs described. Also discussed are requirements for constructing a keyboard mask and program availability.

265 Shworles, T. R. (1983). The person with disability and the benefits of the microcomputer revolution: To have or to have not. Rehabilitation Literature, 44(11-12), 322-330.

The benefits of the personal computer revolution will be unavailable to disabled persons unless new ways are invented for including them in the processes of: (1) learning what is new in information technology, (2) evaluating the usefulness of new findings, and (3) determining what additional research and development should be done. The author cites several organizations that facilitate involvement of disabled persons in computer technology awareness, including the Committee on Personal Computers and the Handicapped (COPH-2), Closing the Gap, a publication that deals exclusively with disabilities and computers and also sponsors workshops and conferences, and TAG, a technical assistance group that answers computer and disability related questions over the phone, by mail, and in person. Opportunities to network and be active participants in the computer technology field is described as critical to insuring that disabled persons do not become "have-nots" in a computer-dependent society.

266 Smith, D. W., & Wells, M. E. (1983). Use of a microcomputer to assist staff in documenting resident progress. Mental Retardation, 21(3), 111-115.

Reports the results of a research project on using a computer program to assist ICF/MR staff to write resident progress notes. A simple to use computer program was written to store and output progress notes. Twenty-six direct care and educational staff participated in the study. Experimental conditions consisted of: (1) hand written notes during the time period of two months prior to computerized note writing, (2) computer assisted note writing for a time period of two months, and (3) handwritten notes for two months following the computer assisted condition. One note per subject from each condition was rated by 10 independent raters. All notes were computer output so that the raters remained unaware of whether the original note was hand or computer written. Results indicate an improvement in the quality of notetaking on the computer as compared to the first experimental condition (notes prior to computer assistance). The quality of handwritten notes after computer interaction was substantially higher than that of handwritten notes before computer instruction, although, lower than those written on the computer. Finally, it is noted that individuals writing notes on the computer took less time (i.e., 30-45 minutes as compared to 2 1/2 hours handwritten per staff member per month).

267 Snodgrass, G., & Campbell, R. (1982). Communication/information systems for special education: The SpecialNet computer telecommunications network. In J. Dominquez & A. Waldstein (Eds.), Educational Applications in Electronic Technology (pp. 33-42). Monmouth, OR: Western States Technical Assistance Resource (WESTAR).

Electronic mail is defined as a system of sending messages from one place to another via computer. A detailed explanation of how the SpecialNet electronic mail service works is presented. An additional benefit of the system is the opportunity to create electronic bulletin boards which can display information and messages. Descriptions of the special purpose bulletin boards FEDERAL, EMPLOYMENT, and EARLYCHILDHOOD are provided as examples of over a dozen boards that are available on SpecialNet. Other electronic mail systems available, including the Source, CompuServe, Bowne Information Systems, and Computer Corporation of America, are listed with addresses and phone numbers. The chapter concludes with a discussion of how to select a system and the necessary hardware to meet individual needs.

268 Southworth, J. H., Dugdale, S., Mackall, P., & Richardson, J. (1980). A multi-state experiment in computer-based education and communication for hearing impaired students. Proceedings of the Association for the Development of Computer-Based Instructional Systems, Western Washington University, Bellingham, Washington, 62-67.

Discusses computer-based education with PLATO (Programmed Logic for Automated Teaching Operations). Several projects using PLATO with hearing impaired students are presented: (1) PLATO use in Champaign-Urbana educational programs for handicapped children (K-5); (2) field-testing math, hearing, and speech visual memory lessons at elementary and primary education levels in Washington, D.C.; and (3) the development and improvement of communication services for the deaf by The Deaf Action Group of Hawaii.

269 SpecialNet (Network). National Association of State Directors of Special Education, 2021 "K" Street, N.W., Suite 315, Washington, D.C., 20006.

SpecialNet is an electronic network for special educators. It provides subscribers an opportunity to receive and share information on services and programs for the handicapped. Over 2,000 subscribers in all 50 states can access the electronic mail system as well as the bulletin boards which cover a broad range of topics (e.g., vocational education, federal legislation, assessment, transition, vision, and multihandicapped). SpecialNet is available to anyone who has access to a computer terminal or microcomputer and a telephone. There is an annual subscription fee plus a basic phone charge for online usage.

270 Specialware Directory (1983). Linc Associates, Inc., 46 Arden Road, Columbus, Ohio, 43214.

This directory, intended as a resource guide for special educators, lists and describes commercially produced software/courseware that is useful for special education. The directory provides the user with an index that divides the entries according to: (1) nine handicapping conditions (e.g., EMR, LD, TMR); (2) hardware (Apple, Atari, Commodore, IBM PC, CP/M Based, Franklin, Monroe, North Star, TI, TRS-80, and Versator); (3) educational level (Early Childhood, Elementary, Secondary, and Postsecondary); (4) professional level (Administrative Support, Authoring Languages/Lesson Writing Programs, Guidance Counselors, IEP Management, Library Applications, Testing and Evaluation Programs, and Teacher Training); (5) instructional approach (CMI, Drill and Practice, Games, Simulations, and Tutorial); (6) curriculum (Arts, Computer Education, Readiness, Foreign Languages, Guidance, Language Arts, Math, Science, Social Studies, and Vocational Education); and (7) product titles. Each product is coded to indicate whether it was designed specifically for special education, marketed or judged useful in special education settings, or designed for regular education but may be useful in special education through modification or adaptation.

271 Special Education Software Center, SRI International, 333 Ravenswood Avenue, Menlo Park, California, 94025; (415) 859-3382 or (800) 223-2711 voice; (800) 435-7639 TTY.

This Center, which is established with funding from the U.S. Department of Education, is operated by SRI, LINC Resources, and Council for Exceptional Children (CEC). SRI provides technical assistance to developers of special education programs. LINC provides an information base of software available for instruction and administration in special education. CEC holds an annual software conference for developers, educators, students, and parents. Services can be requested by phone, mail, or electronic networks.

272 Special Education Software Review (Newletter). 3807 N. Northwood, Peoria, Illinois, 61614.

The Review, an independent newsletter written by special educators, is published five times per school year. It is intended to help professionals and parents in the selection of quality computer software for handicapped individuals. It reviews popular software, identifies new programs, and provides news about special equipment and adaptations. It is available for $25.00 per year from the above address.

273 Stepp, R. E., & Reiners, E. (Eds.) (1982). Microcomputers in education of the hearing impaired (Special Issue). American Annals of the Deaf, 127(5).

This special issue contains 34 articles presented at a national conference in Lincoln, Nebraska. Several articles included are entitled: (1) "Microcomputer Reading Comprehension Improvement Program for the Deaf;" (2) "Mathematics Software, a Computer Lab, and the Hearing Impaired;" (3) "Early Reading in Young Deaf Children Using Microcomputer Technology;" (4) "Lip-Reader Trainer Teaching Aid for the Hearing Impaired;" (5) "Application of Task Analysis to the Design of CAI Programs;" (6) "CAI as a Supplement in a Mainstreamed Hearing-Impaired Program;" (7) "The Computer as a Creative Educational Tool;" and (8) "Microcomputers in Education: Age of Romance, or Age of Reason?"

274 Stolurow, L. M. (1975). Computers in education. In J. Wortis (Ed.), Mental retardation and developmental disabilities: An annual review (Vol. 7). New York: Mazel, Inc.

Summarizes the development of the computer from the early 1950s to the mid-1970s. Also, technical descriptions of computer languages, CAI languages, and systems are presented. Instructional paradigms for CAI software include: (1) problem-solving, (2) inquiry, (3) drill and practice, (4) simulation, (5) gaming, and (6) tutorial. Idiographic models of instruction illustrate the decision process necessasry for designing programs for learning or management. The two applications cited for CAI and mental retardation are for teacher training and training of retarded pupils.

275 Stowitschek, J. J. (Ed.) (1984). Technological advances in special education (Special Issue). *Exceptional Education Quarterly*, *4*(4).

This special issue contains eight articles, the titles of which are: (1) "Microcomputers in Special Education: Implications for Instructional Design," (2) "Making Microcomputers Accessible to Blind Persons," (3) "Once More with Feeling: The Absence of Research on Teacher Use of Microcomputers," (4) "High and Low Technology Approaches in the Development of Communication Systems for Severely Physically Handicapped Persons," (5) "Interactive Video Authoring of Instruction for the Mentally Handicapped," (6) "Electronic Travel Aids for Blind Persons," (7) "Nonvocal Communication Augmentation Using Microcomputers," and (8) "The Potential of Video Disc Technology for the Hearing Impaired."

276 Stowitschek, J. J., & Stowitschek, C. E. (1984). Once more with feeling: The absence of research on teacher use of microcomputers. *Exeptional Education Quarterly*, *4*(4), 23-29.

Overviews research relating to teacher use of microcomputers and its deficiencies and suggests priorities for further research. The article briefly describes the research conducted in four areas: (1) the efficacy of the computer as an instructional alternative to the teacher, (2) comparative research, (3) the efficiency of computer-based instruction, and (4) computer use in special education teacher training. The authors emphasize that the microcomputer's success depends on the teacher and on classroom variables and cite research which suggests that the most appropriate use of the computer is as a supplementary tool. The computer must be compatible with the teacher's instructional style and goals, classroom organization, curricula and materials, and the needs of the learner. Research on teacher use of microcomputers is almost nonexistent, thus little information is known on the major issue of how microcomputers can best be applied in the classroom. Teacher surveys have shown, however, an increasing concern over lack of both pre- and in-service training in computer literacy and instructional applications. Suggested research that would encompass current teacher applications of microcomputers and predict future uses include the areas of teacher planning and competencies and teacher-child interaction groupings. The authors expand on three research areas for teacher planning: (1) long-term management of objectives, (2) daily progress assessment, and (3) instructional materials management. The logistics of classroom use of microcomputers, the training of special educators, and in-service training capabilities of the microcomputer are proposed as areas for further research.

277 Strain, A. (1974). *Computer assisted instruction in social arithmetic for the retarded*. Unpublished doctoral dissertation, University of Calgary.

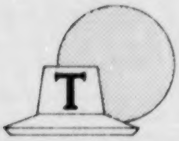
This was a study investigating a computer assisted instruction (CAI) curriculum teaching social arithmetic (purchase transactions skills) to retarded adults. Seventeen trainees from the Vocational Rehabilitation Research Institute participated in the study. Procedures consisted of assessment (pretesting, posttesting, and one week retention testing) and computerized instruction. Testing materials included 20 items: half were presented on the computer as simulated buying problems and the other half were presented using real objects and money (transfer problems). The CAI curriculum was interfaced with slide projection of purchase objects. This program taught the following skills: (1) identification and evaluation of price from a price tag, (2) evaluation of money available, (3) decision regarding whether the item could be purchased with the available money, (4) anticipation of correct change or calculation of additional necessary funds, and (5) evaluation of change received or additional necessary funds. Results reflect that all but one subject reached performance criterion (5 consecutive correct responses) during instruction. In addition, instruction resulted in faster performance on the computer administered test items and more accurate performance on the transfer test items. Improvement was significant from pretest and posttest and from pretest to retention test.

278 Stuckless, E. R. (1981). Real-time graphic display and language development for the hearing impaired. *Volta Review*, *83*(5), 291-300.

The four common ways to aid language development in hearing impaired children are amplification and auditory training, intensive language instruction, introduction of manual communication, and real-time graphic display. This article addresses the latter approach, which is the presentation of language in printed or written form to one person as it is being generated by another. Discussion of differences between spoken and graphic communication, visual processing of language, and traditional print are included. The real-time graphic display characteristics described are: (1) conversion of speech into print, (2) real-time print, and (3) transience of real-time print. Real-time graphic display is noted as having the potential of augmenting the other approaches to language acquisition already in use, particularly with profoundly deaf children.

279 Swaine, M. (1983). Giving disabled an extension of the will to dance. *InfoWorld*, *5*(13), 23-24.

Reports the development of generic lowcost robotic devices for the physically disabled. Robotic development is approached in a general way, attempting to meet a broad functional service rather than the cost prohibitive practice of designing special devices for specific needs. Examples of functional robotics are the robotic arm, graphic communication, and speech synthesis.



280 Taber, F. M. (1982, February). *MCE field study project*. Paper presented at the National Convention of the Council for Exceptional Children, Houston, Texas. (ERIC Document Reproduction Service No. ED 230 174)

Reports the findings of the field testing of six microcomputer programs designed for secondary and adult special needs populations. The programs teach basic living skills including vocations, elementary budgeting, money management assessment, banking, and home safety. Fourteen classrooms in three school districts were used for the field test. Students ranged in age from eight through adult and included emotionally disturbed, gifted, autistic, physically handicapped, and profoundly deaf. Results indicate that using the programs had many positive results in the cognitive and effective domains and some positive results in the psychomotor domain. These results were found in the areas of content, educational adequacy, and technical adequacy. The outcomes are most promising for the autistic population. Teacher evaluation questionnaires and vocabulary test results are included in appendices.

281 Taber, F. M. (1982). *Microcomputers in special education: Selection and decision making process*. Arlington, VA: Council for Exceptional Children.

This book provides information and guidance for school administrators to assist them in selecting microcomputer systems. Included are chapters on effective use of the microcomputer for instructional and administrative purposes, programming, and special education applications for the microcomputer. Rating forms and questionnaires related to evaluation of software and hardware are also provided.

282 Talmy, S. (1983). Computing for the handicapped. *Creative Computing*, *9*(12), 332-333.

Introduces the Audio Visual Operating Systems (AVOS) for the visually impaired. This system consists of a standard Osborne 1, two 5 1/4" double density drivers with 185k of storage per drive, and the Street Electronics Echo voice synthesizer. The software, supplied with the system, consists of: (1) a self-loading voice driver system, (2) a voice-oriented text editor/word processor, (3) a text formatter for printer output, (4) a filing/database program, (5) a personal finance package, and (6) a couple of games. Also included are eight tutorial and reference cassettes that teach computer use and programming. All programs give simple vocal prompts which are displayed on the screen. Assets and limitations of AVOS are also discussed. For more information, write AVOS, Inc., 1485 Energy Park Drive, Minneapolis, Minnesota, 55108; (612) 646-1515.

283 Talmy, S. (1984). Computing for the handicapped. Creative Computing, 10(2), 222-225.

Updates the uses of the Voice Input Module (VIM) for use by handicapped persons. VIM is a voice recognition module which can be programmed to recognize 172 different words. VIM comes with several pre-programmed vocabularies for standard programs such as WordStar, VisiCalc, and Apple Basic. Further utilization of the VIM for the handicapped person can be accomplished with the addition of the cash board (computer aided system for the handicapped), which allows for the handicapped person to virtually run the entire household by voice command along (e.g., turning on lights, adjusting the heat, answering the phone, etc.). A voice synthesizer also can be added for persons with visual impairment.

284 Tawney, J. W., & Cartwright, G. P. (1981). Teaching in a technology-oriented society. Teacher Education and Special Education, 4(3), 3-14.

Discusses technological development in terms of the general directions of technological thrusts and specific products that may assist special education teachers to program for students in the future. General computer technology is presented according to computer synthesized speech and computer technology applications (e.g., information management, computer-assisted instruction, computer games, and novel computer systems). Technology applications are defined as both indirect and direct uses. Indirect uses pertains to those applications that are used by others to benefit the handicapped, whereas direct uses include educational applications and other applications which help handicapped persons interact with their environment and other persons. Some of the direct uses are communications and mobility aids.

285 Taymans, J., & Malouf, D. (1984). A hard look at software in computer assisted instruction in special education. The Pointer, 28(2), 12-15.

Two basic ways of using computer assisted instruction (CAI) are discussed (i.e., to supplement instruction given by teachers and to be used in place of the teacher). The authors make the following suggestions for utilizing teacher developed software: (1) it should be targeted at needs which are not met by available software, (2) libraries of programs and subroutines should be developed and made available to teachers, and (3) teacher training and support should be an integral and ongoing part of system. They also describe learning problems exhibited by many special education students and make suggestions for selecting and adapting software based on those characteristics, which include: (1) reading problems, (2) slow or impulsive responses, (3) spelling and motor problems, (4) perception and attention problems, (5) memory deficits, (6) feedback and reinforcement, and (7) motivational characteristics.

286 Technology and disability II (1983). *Rehabilitation Literature* (Special Issue), *44*, 11-12.

This issue includes articles and reports on the use of technology with disabled persons. Some of the titles are: (1) "The Person with Disability and the Benefits of the Microcomputer Revolution: To Have or to Have Not," (2) "A Computer Program to Assist Persons with Physical or Visual Impairments in Notetaking," and (3) "Rich Creech: Pioneer in Technology for Nonspeaking Individuals." Also included is a resource section, a list of new products, and book review.

287 Technology and Media (TAM), a division of the Council for Exceptional Children. Council for Exceptional Children (CEC), 1920 Association Drive, Reston, Virginia, 22091; (703) 620-2660.

TAM is an organization for professionals, parents, and handicapped individuals who are interested in the use of technology and media in diagnosis, treatment, and educational rehabilitation of exceptional persons. Members receive a newsletter and the quarterly *Journal of Special Education Technology*. TAM offers technical assistance in using microcomputers, a speakers bureau, workshops, and conferences.

288 Technology in special education (1984). *Teaching Exceptional Children* (Special Issue), *16*(4).

Articles addressing issues of technology use with the handicapped and the gifted are included in this special issue. Some of the titles are: (1) "The Challenge of Technology: Educating the Exceptional Child for the World of Tomorrow," (2) "A Tool for Evaluating Educational Software," (3) "Computer Assisted Learning for Mildly Handicapped Students," and (4) "Technology and Special Education: A Resource Guide."

289 Technical Education Research Centers, Inc. (TERC), 1696 Massachusettes Avenue, Cambridge, Massachusetts, 02138; (617) 547-3890.

TERC is a research and development corporation interested in effective use of microcomputers in the classroom. Two projects funded by the U.S. Department of Education are an adaptation using microcomputers to teach science to mildly learning disabled elementary students and the development of an adaptive interface to enable the physically handicapped to operate standard software. *Hands On* is the organization's newsletter, which includes information on special needs populations.

290 Telecommunications in Special Education (1983). Education Turnkey Systems, Inc., 256 North Washington Street, Falls Church, Virginia, 22046.

Reports the present and future status of telecommunication technologies in regular and special education. One of four reports published by Education Turnkey, funded by Special Education Programs, U.S. Department of Education, this document describes technological and economic aspects of videotex and teletex, subscription services, satellite broadcasting, cable television, and video/audio teleconferencing. SpecialNet and Silent Network are among eight forms of telecommunications cited applicable to special educators and handicapped users. Factors discussed that will affect this technology within the next five years are hardware advances, software development, and the capabilities of local schools.

291 Thier, H. (Project Director) (1983-1984). Computer literacy for visually impaired students. (University of California, Berkeley, Lawrence Hall of Science, Berkeley, California, 94720; (415) 642-3679) Grant awarded from the U.S. Department of Education.

The purpose of this project is to assess the educational potential of computer hardware and software for blind and low-vision students who are 12 to 21 years old. An interdisciplinary team (e.g., math curriculum developers, math and computer science educators, educators of the visually impaired, and staff development personnel) will examine available devices and programs that will give visually impaired students access to computer technology. The outcome of the collective evaluation effort will include recommendations for hardware/software use with the visually impaired.

292 Thomas, M. (Project Director) (1983-1986). Moving ahead: Training resource personnel in the application of educational technology in programs for handicapped students. (District of Columbia Public Schools, Division of Special Education and Pupil Personnel Service, Webster Administration Building, 10th and H Streets, N.W., Washington, D.C., 20202; (202) 724-4018) Grant awarded from the U.S. Department of Education.

The purpose of this project is to train resource personnel as instructional leaders and trainers in applying technological educational tools in special education programs. The training will include 16 day sessions covering curriculum development, equipment evaluation and adaptation, program development, and equipment use.

293 Thorkildsen, R., Allard, K., & Reid, B. (1983). The interactive videodisc for special education project: Providing CAI for the mentally retarded. The Computing Teacher, 10(8), 73-76.

Describes components of the Interactive Videodisk for Special Education Technology (IVSET) project. The purpose of IVSET is to develop and field test computer aided instruction and assessment systems for mentally handicapped students. Specific components of the project have included the development of (1) a microcomputer/videodisc (MCVD) system and accompanying instructional programs, (2) a bilingual computer-aided math assessment instrument, and (3) a social skills curriculum for emotionally disturbed students. Instructional software to accompany the MCVD system has been written to teach the following content to retarded students: time-telling, identification of coins, functional words, sight reading, and directional preposition. Field tests have been conducted to determine the effectiveness of these programs. Results indicate that the MCVD programs are least effective with young students classified as severely or moderately retarded. Conversely, the system is most effective with learning disabled or mildly retarded students. The math assessment instrument was developed as a criterion referenced measure of math skills between grades 1-3. The instrument can be administered in either English or Spanish. Output includes an individual skill mastery profile and error analysis. The social skills program consists of seven units of instruction that teach social skill rules and discrimination between examples and nonexamples of the skill. In addition, the curriculum presents situations that prompt rehearsal and role playing.

294 Thorkildsen, R., & Friedman, S. (1984). Videodisks in the classroom. T.H.E. Journal, 11(7), 90-95.

Presented is videodisk technology and its educational and special educational applications. Videodisk technology consists of the videodisk, the videodisk player, and the equipment required to produce the videodisk. The videodisk player can be controlled at three levels of interactivity, including: (1) manual control from a remote control device, (2) microprocessor control, and (3) interface with an external computer. A comparison of videodisk and videotape indicates that the major advantage of videodisk use is its random access capacity which speeds searches. One disadvantage is that disks function as read-only systems, without recording capabilities. Videodisk applications in education are discussed both for college students and special education. A major educational advantage of videodisk use in education is the control both teachers and students can exert over the presentation of information. The Interactive Videodisc for Special Education (IVSET) project is presented.

295 Thorkildsen, R., & Hofmeister, A. (1984). Interactive video authoring of instruction for the mentally handicapped. Exceptional Education Quarterly, 4(4), 57-73.

Describes the development and field testing of a microcomputer controlled videodisc system and an authoring system designed to alleviate some research and communication problems associated with computer assisted instruction (CAI) and mentally handicapped learners. The system was developed by the staff of the Interactive Videodisc for Special Education Technology Project (IVSET) at Utah State University. Specific criteria, the instructional scripting process, and program controls for the videodisc authoring system are reviewed. Six field tested instructional programs developed for use with the Microcomputer/Videodisc system are also mentioned. Based on the IVSET project, the author is convinced of the great potential of interactive videodisc systems for assessment, diagnosis, prescriptions, and instruction of handicapped and normal students.

296 Thormann, J. (1982). Public school use of computers in special education. Unpublished doctoral dissertation, University of Oregon.

Reports the findings of an investigation of the use of computers in special education in Oregon public schools. Over 200 special education coordinators were asked to fill out a questionnaire. Results from the 174 forms returned indicate that 37% of the districts use computers. The uses are primarily for drill and practice, academic games, simulations, and storage and retrieval of student information. Teachers report that the computer is highly motivating and that its use boosts special education students' self-esteem. The primary reasons for use are availability and local expertise. Interviewees' knowledge about computers is typically gained through self-instruction and some inservice training. Over 60% of the teachers are "positive" toward the use of computers in special education. Coordinators are interested in further training or information about available software, computer literacy, and programming.

297 Thormann, J. (1984). Sharing curriculum and decreasing paperwork in special education: Problems and solutions. SIG Bulletin, 1(4), 53-55.

Discusses the use of a computer based system, the Curriculum Management System Network (CMSNetwork), which provides the free exchange of curriculas and resources. CMSNetwork contains single and multiple versions of curriculum in an extensive range of subjects and aims at solving the problem of inadequate resources, duplication of effort, and development of a well designed curricula. In addition, CMSNetwork can be used, in combination with compatible software, to write goals, objectives, and resources to develop individual education plans (IEPs).

298 Thormann, J., & Gersten, R. (1984). Microcomputers in special education: Results of a statewide survey. Unpublished manuscript, University of Oregon, Division of Special Education and Rehabilitation, Eugene, Oregon.

Describes a comprehensive study of the use of microcomputers in special education in the State of Oregon, during the 1981-82 school year. Questionnaires and interviews were used to gather information on the extent of use, perceived problems with software, and issues in computer assisted instruction (CAI) integration into regular curriculum. Teachers' estimates indicate that approximately 58% of special education students use the computer in some fashion. Forty percent of the teachers state that the primary use of computers is as a reward or a tool for reinforcement. The most commonly used software is drill and practice followed by academic games and/or extracurricular games. The most frequently listed limitation of existing software is its inability to be modified to meet the needs or acquisition rates of students. The implications of the research findings are: (1) computers represent a small part of the instructional program,

(2) computers currently serve as "workbook function," (3) existing software is perceived as lacking principles of instructional design, and (4) computers appear to enhance student motivation and increase time on task.

299 Tindall, L. W., & Gugerty, J. J. (1984). Effective microcomputer assisted instruction for the vocational education of special needs students. Vocational Studies Center, University of Wisconsin-Madison.

This manual contains information about microcomputer assisted instructional programs developed and/or used by practitioners in vocational classes, resource rooms, and prevocational settings. It includes descriptions of programs and identifies the developer, the contact person, vocational area, and type of student for which it was found effective. Program formats and descriptions of modifications for special populations are also included. The manual concludes with selected articles on microcomputer assisted instruction. The manual is available for $25.00 from The Vocational Studies Center, University of Wisconsin-Madison, Publications Unit, 964 Educational Sciences Building, 1025 W. Johnson Street, Madison, Wisconsin, 53706.

300 Tinker, R. (Project Director) (1983-1985). Technology compensatory activities: Severely physically-impaired persons. (Technical Education Research Centers, Inc., 8 Eliot Street, Cambridge, Massachusetts, 02138; (617) 547-3890) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a general purpose adaptive interface unit to permit handicapped students access to software designed for Atari, Commodore 64, Apple IIe+, Apple IIe, and IBM PC computers. The developed hardware and peripherals will permit use of unadapted commercial software.

301 Torgesen, J., & Young, K. (1983). Priorities for the use of microcomputers with learning disabled children. Journal of Learning Disabilities, 16(4), 234-237.

Sets out priorities for the development and use of computer resources for instructional purposes with elementary-aged learning disabled students. These priorities are different from those used for normal children or adolescents. The first principle that must be applied is that of using the computer for teaching in a unique fashion (i.e., no other methods are available for presenting this type of information). The second principle that should guide priority setting is that of educational necessity. The first priority, therefore, is that of using the computer to provide practice activities for the development of efficiency in reading individual words. The article includes a discussion of the problem area of reading for LD students and suggestions for computer use to alleviate some of these problems.

302 Trace Center Information Brochure (1984, August). Trace Research and Development Center on Communication Control and Computer Access for Handicapped Individuals. University of Wisconsin-Madison, 314 Waisman Center, 1500 Highland Avenue, Madison, Wisconsin, 53706.

Lists over 30 titles and descriptions of materials available from the Trace R & D Center. Resource books include the 1983 Revised Nonvocal Communication Resource Book, Nonvocal Communication Techniques and Aids for the Severely Physically Handicapped, and International Software/Hardware Registry. Also listed are titles of article reprints by the Center's staff on the use of communication devices, application of microcomputers, and adaptive equipment. The BlissApple Program for the Apple computer, including a disk and 200 page manual, is also available. Prices and information for ordering materials are provided.

303 Trace Software/Hardware Registry (1984). Trace Research and Development Center on the Communication Control and Computer Access for Handicapped Individuals, 314 Waisman Center, 1500 Highland Avenue, Madison, Wisconsin, 53706.

This registry provides a listing of microcomputer programs which has been written or adapted for use by physically handicapped individuals. Included in the listing is: (1) a brief description of each program, (2) the computer(s) it will run on, (3) the memory requirements, (4) the programming language, and (5) the necessary peripherals. The cost of this book is $25.00. Updates for past editions are also available. In addition to this registry, the Trace Center collects and disseminates documents on the application of technology in meeting the communication needs of the nonvocal and other handicapped persons, publishes a variety of materials on technology and communication problems, and develops input and output computer devices to meet the specific needs of disabled persons.

304 Traynor, C. D., & Beukelman, D. R. (1984). Nonvocal communication augmentation using microcomputers. Exceptional Education Quarterly, 4(4), 90-103.

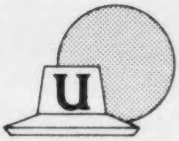
Details the uses of the microcomputers to enhance the communication capability of the 1.25 million persons in the United States who do not functionally communicate their needs. Microcomputers have been used in two major formats. Specifically, there are the commercially available communication augmentation systems with dedicated microprocessors as components and personal computers programmed for specific communication functions. The flexibility of communication system functions has increased in several ways due to dedicated microprocessor technology. Those functions include: (1) "message retrieval," which is common in communication augmentation systems such as the Express III, Autocom, and Handivoice 130; (2) synthesized speech, which is available with the Echo II, the Handivoice 130, and the Votrax Type-n-Talk; (3) ability to "buffer" communication for transmission at a later time; and (4) word processing, which is becoming available in some experimental systems, like the Morse Code Communication System. The authors note that personal computers have allowed the development of communication systems to meet highly specialized needs, while restrictions in portability have limited system use. Several options which permit nonspeaking severely physically handicapped persons to use personal computers with standard software are also discussed. Those are specialized keyboards, computer interface units, and different input modes. The article also examines the improvement of communication augmentation speed as a major focus of research at both the University of Washington and the Trace Center in Madison, Wisconsin.

305 Trifiletti, J., Frith, G., & Armstrong, S. (1984). Microcomputers versus resource rooms for LD students: A preliminary investigation of the effects on math skills. Learning Disability Quarterly, 7(1), 69-76.

In a comparison of computer assisted math instruction and traditional resource room math instruction, 12 learning disabled students were given 40 minutes of instruction daily on SPARK-80 Computerized Mathematics System (at Radio Shack terminals), and 9 learning disabled students were given 40 minutes of daily instruction in a traditional math resource room by instructors. Mid-year evaluations showed significantly greater results from the computer-assisted group than from the resource room group in math skills mastered and fluency of problem-solving. The computer-assisted group also produced more than twice the yearly achievement gains and number of math skills learned. The results are statistically significant at the .05 level.

306 Turkel, S., & Podell, D. (1984). Computer assisted learning for mildly handicapped students. Teaching Exceptional Children, 16(4), 258-262.

Discusses the potential of the microcomputer as a tool for the special education student. The difference between passive computer assisted instruction (CAI) and interactive computer assisted learning (CAL) is cited. Logo was successfully used in a New York project to illustrate this interactive approach to learning. Learning problems of the mildly handicapped, including lack of attention and off task behaviors, impulsivity, failure expectations, and poor organizational skills, are addressed. The project demonstrated that these problems were minimized through the use of CAL. Students were generally focused, systematic in their problem-solving behavior, organized, on task, and logical. They appeared motivated to interact with the computer in a creative way. The authors suggest that further study is needed but that CAL may have the potential to motivate active problem-solving in special education students.



307 Use of Computers in Regular and Special Education Teacher Education (No. 509). CEC/ERIC Computer Search Reprints, CEC Publications Sales, 1920 Association Drive, Reston, Virginia, 22091.

This computer search reprint consists of 100 bibliographic abstracts on the above topic. The literature is derived from both the Exceptional Child Education Resources (ECER) and Educational Resources Information Center (ERIC) data bases. The price of this computer search reprint No. 509 is $8.50 for Council for Exceptional Children (CEC) members and $10.00 for all others.

308 Uslan, D. T. (1983). Breaking the silence barrier. The Exceptional Parent, 13(3), 27-30.

Reports the results of a workshop on the application of microcomputers in special education to school personnel in a remote rural setting. This article describes the emotional reaction of one deaf teacher upon having his word understood for the first time in his life via a voice input module.

309 Uslan, W., Smith, R., Schreibman, K., & Maure, D. (1983). AFB's Computerized travel aid: Two years of research and development. Journal of Visual Impairment & Blindness, 77(2), 71-75.

Describes American Federation for the Blind's progress toward developing a low-cost,, versatile computerized travel aid (CTA) that combines Polaroid's Solar Camera transducer and associated electronics with a small microprocessor. The unit would present information as audible output and be carried in hand, mounted on a cane, or hung from the neck on a strap.

V

310 Vance, B., & Hayden, D. (1982). Use of microcomputer to manage assessment data. *Journal of Learning Disabilities*, *15*(8), 496-498.

Describes a Special Education Management System (SEMS) that could be used by special education staff and faculty to manage the paperwork associated with implementing state and federal education laws. SEMS stores and files assessment data which can assist educational diagnosticians in (1) individual record-keeping; (2) writing IEPs; (3) developing instructional technology from assessment data; (4) linking assessment data to instructional programming; (5) research projects; and (6) classroom and instructional management, such as grouping students based on instructional level. The retrieval and storage program, which is displayed on a TRS-80 microcomputer, is a file management program used to create, maintain, and summarize assessmsent data, particularly the Wechsler Intelligence Scale for Children-Revised (WISC-R). The basic procedure for using the program is described.

311 Vanderheiden, G. C. (Project Director) (1983-1985). *Technology compensatory activities: Severely physically-impaired persons*. (University of Wisconsin, A. W. Peterson Building, 750 University Avenue, Madison, Wisconsin, 53706; (608) 262-3822) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop a relatively low-cost portable unit to provide handicapped users with basic communicative (written and conversational) abilities, as well as access to standard software and computers through keyboard emulators.

312 Vanderheiden, G. C. (Project Director) (1983-1988). *Communication systems for severely impaired persons*. (University of Wisconsin, Rehabilitation Engineering Center, Trace Center, 750 University Avenue, Madison, Wisconsin; (608) 262-6966) Grant awarded from the U.S. Department of Education.

The purpose of this Rehabilitation Engineering Center is to overcome barriers to conversational interaction, writing, access to information and data processing, and control of essential devices in the home, work place, and school. The program emphasizes research, development, utilization, information dissemination, and training.

313 Vanderheiden, G. C. (1984). High and low technology approaches in the development of communication systems for severely physically handicapped persons. Exceptional Education Quarterly, 4(4), 40-56.

Presents an overview of the basic approaches for providing augmentative forms of communication to severely physically handicapped individuals. The advantages and disadvantages of direct selection, scanning, and the multisignal approach are discussed. The article also presents the techniques to implement these approaches, which range from fundamental to sophisticated, and discusses the advantages and disadvantages of each category level. Selection and implementation of a communication system are dependent on individual capabilities and situations. The variables which should be included in the selection process are: (1) flexibility, (2) cost, (3) speed, (4) independence, (5) maintenance and reliability, (6) individual's current interaction abilities and needs, and (7) individual's future needs.

314 Varnhagen, S., & Gerber, M. (1984). Use of microcomputers for spelling assessment: Reasons to be cautious. Learning Disability Quarterly, 7(3), 266-270.

This study investigated the differential effects of the Test of Written Spelling when it was administered in two ways (i.e., standard fashion and via microcomputer). The two groups that received the test twice consisted of learning handicapped students in a self-contained class and underachieveing students from a regular class. The results show that both groups did better when administered the standard written version. Not only did they spell more words correctly but it took them less time. The authors recommend that caution be taken in adapting standardized dictation spelling tests for computer administration.

315 Vensel, G. (1981). Changes in attitudes of preservice special educators toward computers. Teacher Education and Special Education, 4(3), 40-43.

This study measured the attitudes of special education students toward computers and was designed to determine whether a demonstration of a microcomputer's educational uses would have a positive effect on them. Initially, the subjects were not generally favorable toward computer use in the classroom, however, following the demonstration there was a positive shift in attitude. The author suggests that the low level of enthusiasm may result from a lack of computer literacy among special education students.

316 Videodiscs in Special Education (1983). Education Turnkey Systems, Inc., 256 North Washington Street, Falls Church, Virginia, 22046.

One of four reports designed to assess the current state of new technological features and prices of videodisc systems. Potential applications and the flexibility of the systems are reviewed as they apply to general education. Five categories of use include: (1) visual reference materials, (2) teacher training material, (3) instructional programming, (4) teacher continuing education, and (5) information storage and retrieval. Also described are software development activities at seven universities and trends that will be seen in the coming years. Special education is cited as an area where there is enormous potential for using the videodisc due to its capabilities for ease of use, single-concept presentation to individual students, teacher inservice training, and information storage and retrieval. Noted are several development projects supported by Special Education Programs, including Utah State University's math instructional management system for MR and LD students and the University of Nebraska's Media Development Project for the hearing impaired. Among the factors listed as affecting current use are drawbacks in the hardware, lack of software, cost, and need for teacher training.

317 Vincent, A. T. (1979). The effects of supplementary CAI on the math and reading achievement of EMR high school students. Proceedings from the 17th Annual Convention for the Association for Educational Data Systems, Detroit, Michigan, 6-10.

Presented are two case studies designed to determine the efficiency of computer assisted instruction (CAI) with educable mentally retarded students. The content focus was math and reading for study one and two, respectively. Both software programs were used to supplement ordinary teacher instruction in these areas. EMR students in grades 9 through 12 participated. The results of both studies were jointly analyzed. The students who received a CAI supplementary instruction improved in their performance and attitude toward math and reading significantly greater than those not introduced to the software instruction.

318 Vincent, T. (1982). Computer assisted support for blind students: The use of a microcomputer linked voice synthesizer. Computers & Education, 6(1), 55-60.

Describes useful techniques to enable blind students to independently use computers and computer assisted instruction (CAI). The three ways in which speech synthesis can be employed in CAI are speech-by-rule, look up tables, and compressed digital speech. With a speech-by-rule system, a computer program translates text into its phonetic equivalent (derived from a restricted set of commands); the synthesizer creates speech from these commands. The phonetic equivalent of text is converted from a table of information in the look up table system; this system is limited, of course, to the size of the table. The compressed digital speech system consists of speech recorded in analogue form on magnetic tape. The recorded message is replayed under computer control. With this information as an introduction, a program using the look up table system is described in detail. An interface is designed so that a PRINT statement is interpreted as a speech output command.

W

319 Waldron, M., & Rose, S. (1983). Visual thinking for severe language handicapped children through the use of computer graphics. Journal of Computer-Based Instruction, 9, 206-210.

Presents the feasibility of using computer graphics to enhance cognitive skills in profoundly hearing disabled children. A series of nonverbal thinking tasks were developed for use on a minicomputer or interactive graphics terminal. The tasks were in cognitive areas of spatial relations, pattern recognition, matrix board, and inferencing. The purpose of the computer software was to provide hearing impaired children with an alternative (nonspeech) mode for accessing communication and cognitive processes by capitalizing on visual and tactical sensory input. Essentially, the software generates and performs transformations of graphic pictures. Modifiability is built into the software in that teachers can create and store graphic designs to be implemented into student interaction tasks. Several tasks were developed to teach cognitive areas (e.g., spatial relations, pattern recognition) and designed to access cognitive styles and problem-solving skills without the use of standard English. Pilot testing reveals that deaf and hearing subjects performed equally well on the tasks; however, their cognitive approach was significantly different. The deaf subjects were proficient in the visual environment while hearing students required supplemental verbal information.

320 Wall, N. (1984). Microcomputer activiites and occupational therapy. The Exceptional Parent, 14(4), 25-28.

Discusses the need for individual assessment of student skills and understanding to match with the versatility of the computer. Other topics presented include: (1) input and output devices to aid access by physically impaired users; (2) software available for disabled learners; (3) Logo; and (4) psychosocial needs to which computer learning can be applied (i.e., group interaction skills, work and school behaviors, and self concept).

321 Walker, B. (1983). Microcomputer Courseware. EduTech, JWK International Corporation, 7617 Little River Turnpike, Annandale, Virginia, 22003.

This report, available for no charge, is designed to assist special educators in their search for educational software/courseware intended for classroom instruction. The first section presents background information about microcomputer technology, courseware developers, and the educational marketplace. As educators increase their understanding of the capabilities of microcomputers, they will be better able to influence the quality and supply of courseware. The second section, "Understanding Microcomputer

Courseware," focuses on the terminology commonly used in the literature about quality courseware. Discussed are hardware and software distinctions, applications (CAI, CBI, and CMI), types (drill and practice, tutorial, and simulations), technical features (system requirements, courseware formats, and input devices), instructional considerations (interactive, learner control, and branching), and documentation. The third section includes a consideration of technical and aesthetic features, instructional features, and characteristics associated with classroom use. A checklist of things to look for in quality courseware is included. The final section presents several ways in which educators can deal with immediate courseware problems.

322 Watt, P. (1984). Computers give independence to the disabled. InfoWorld, 6(12), 30-31.

For the past nine years, the Center for Independent Living in Berkeley, California has conducted an intensive training course in computer programming of its graduates. This center is just one of 27 "life" centers across the country offering training courses in computer programming for disabled people. These training programs are sponsored by IBM and state departments of rehabilitation. The authors also allude to several companies which specialize in adaptive aids for the disabled. These companies are: (1) Computer Aids, owned by blind people and devoted to meeting the needs of blind computer users; (2) Medical Equipment Distributors, manufacturers of interfaces for the severely handicapped; and (3) Raised Dot Computing, specialists in adaptive devices for the blind.

323 Weinberg, B. (1980). The Kurzweil machine--half a miracle. American Libraries, 11(10), 603-604, 627.

Discusses the use of the Kurzweil Reading Machines (KRM) in the New York Public Library. This machine transforms printed words into speech and thus provides the blind with direct access to more than one half million books and thousands of periodicals. Training a KRM reader takes 6-10 hours. Regular users are described as most often being students and people employed in jobs that require keeping up with current developments in their fields.

324 Weir, S. (1982). Logo: A learning environment for the severely handicapped. Journal of Special Education Technology, 5(1), 20-22.

Discusses the advantages of using Logo computer language with handicapped children. Logo language creates a computer based learning environment that assists teachers in tailoring the learning situation to individual children while allowing the user to maintain initiative and control. Described are two handicapped children who easily used Logo. Mike, a 17-year-old physically disabled boy, learned to program in Logo and has become proficient in it. He has been accepted into a Computer Science program as a result of his interest and ability in programming. Elly, a 7-year-old girl, uses the turtle graphics capabilities of Logo to write stories. Logo has assisted her in concentration, perception of cause-effect relationships, and motivation.

325 Western Center for Microcomputers in Special Education, Inc., 1259 El Camino Real, Suite 275, Menlo Park, California, 94025; (415) 326-6997.

This nonprofit corporation assists schools and individuals in the process of acquisition and utilization of microcomputers in specialized systems. The Western Center also provides expertise in solving interface and operating problems as well as technical assistance for using microcomputers in special education. An educational discount is available on selected systems, peripheral devices, control interfaces, and software. The quarterly newsletter, The Catalyst, features articles, reader requests, conference publications, product announcements, and selected SpecialNet bulletin board excerpts. Annual subscription rates are $15.00 for institutions and $10.00 for individuals.

326 Wilson, K. (1982). Computer systems for special educators. In J. Dominguez & A. Waldstein (Eds.), Educational applications in electronic technology (pp. 1-21). Monmouth, OR: Western States Technical Assistance Resource (WESTAR).

Outlines the basic stages involved in selecting and implementing a computer system for computer managed instruction. Also described are potential problem areas, specific questions to ask, and decisions to be made at each stage. The first stage requires evaluation of data needs and instructional/case management questions. Hands-on orientation to computer use is recommended. Once an understanding of computer support need is reached, the next step is locating the software that suits those needs. At this stage, estimates are made of computer impact on the work place and costs. Initial expectations may have to be modified to meet the limitations of computers and software available. In the initial decision stage, it is recommended that software be considered first and hardware chosen to match. The major issues in the design decisions also are discussed. They include: (1) flexibility vs. rigidity, (2) dynamic vs. fixed format information storage, (3) system integration, (4) user definability, (5) direct access vs. service bureau, (6) custom software vs. off-the-shelf software, (7) top-down administrative design or bottom-up staff-oriented design, (8) portability and user interchange, and (9) simplicity of the human-computer interface. During the implementation stage, the system is installed, the staff is trained, and routines are established. Adjustments in operation costs may have to be made. Once the system has been integrated into the workplace and the work style, the enhancing the system stage begins. This is described as expanding the system (networking), introducing new software, and improving computer capabilities. Future issues include the development of nationwide databases, low-cost computer communications, and improved effectiveness of management software.

327 Wilson, K., & Bates, M. (1981). Artificial intelligence in computer-based language instruction. Volta Review, 83(5), 336-349.

Defines Artificial Intelligence (AI) and explores its problems and potential through a detailed scenario with a hearing-impaired child. Principles for instruction via AI tutorials are discussed. They include: (1) tutorials must be intrinsically motivating and entertaining, (2) language should be learned in functional contexts with didactic approaches at the student's request, (3) tutorials should be sensitive to student's level of language understanding, and (4) diagnostic and assessment information should be made available to student and teachers in a useful form. Two major problems related to AI instruction are the need for more sophisticated software and lower hardware prices.

328 Withrow, F. B. (Ed.) (1981). Learning technology and the hearing impaired (Special Issue). Volta Review, 83(5).

This special issue contains the following 10 articles: (1) "Educational Media and Technology for the Hearing-Impaired Learner--An Historical Overview," (2) "Telecommunication and the Hearing Impaired," (3) "Close-Captioned Television and the Hearing Impaired," (4) "Real-Time Graphic Display and Language Development for the Hearing Impaired," (5) "Speech Technology and Communication for the Hearing Impaired," (6) "Technology to Facilitate Language Acquisition," (7) "Videodisc for the Hearing Impaired," (8) "Computer Assisted Instruction for the Hearing Impaired," (9) "Artificial Intelligence in Computer-Based Language Instruction," and (10) "Future Implications for Technology in the 80s."

329 Withrow, M. S. (1978-1979). Computer graphics and language instruction for the deaf. Journal of Educational Technology Systems, 7(1), 39-43.

Previews the educational materials being developed for a language instruction program for deaf children. The materials will coordinate language development concepts and spoken and written language in synergistic interaction. Television, which is known to hold and sustain children's attention, will be used to display a three-dimensional computer graphic. The development of three-dimensional computer graphics, which can feed a video recorder, provides a unique format for associating visual and auditory images with the acquisition of language principles. During the project, two forms of materials will be developed: (1) four 15-minute interactive three-dimensional, 3/4" video cassettes; and (2) sound filmstrips. Formative evaluations will be carried out during development of each of the materials and a pilot study will follow completion of each.

330 Withrow, M. S. (1981). Technology to facilitate language acquisition. Volta Review, 83(5), 311-320.

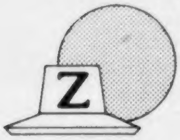
Compared are the language developmental needs of normal hearing students with hearing-impaired students. The author notes that deaf persons rely heavily on visual input. Comparisons are drawn between deaf and hearing children's use of television and how that interest can be utilized in teaching language skills. The technological applications in language education for the deaf include: (1) the use of computer-assisted education (CAI); (2) the use of PLATO (a computer-based instructional system) in drill and practice to increase visual memory skills; (3) integration of microcomputer and videotape replay systems to provide precise, illustrative instruction; (4) videodisks; and (5) the combination of videodisk and computer.

331 Woo, J., Jr. (Project Director) (1983-1984). Development of a computer-assisted proofreading system for the handicapped. (GAMMA Research, Inc., 555 Sparkman Drive, Suite 802D, Huntsville, Alabama, 35805; (205) 830-2558) Grant awarded from the U.S. Department of Education.

The purpose of this project is to design a more accurate system of manual data input that will provide greater control and productivity among handicapped data base operators. The project will emphasize improved use of computers in educating, training, and placing handicapped workers.

332 Wright, A. (1981). Instructional technology for special needs. Project Planning Center, Ministry of Education, Legislative Buildings, Victoria, British Columbia, Canada, V8V 1X4.

This discussion paper presents issues and ideas on the use of new technologies with the handicapped. Readers are invited to respond to various topics including: (1) interactive videotape/disc; (2) Kurzweil Reading Machine and other aids for the visually impaired; (3) computer assisted speech and language instruction for the deaf; (4) communication and compensatory aids for the motor impaired; and (5) technologies to enhance communication for the severely handicapped, nonverbal, aphasic, and foreign speaking student. The paper concludes with nine appendices reviewing books, articles, and projects on related topics.



333 Zembrosky-Barkin, P., & Hopkins, S. (1984). Computer resources for special educators. SIG Bulletin, 1(3), 14-16.

Lists 23 resources of particular interest to classroom teachers in special education. Mailing addresses are included for catalogs, free materials, newsletters, and journals. This column is provided for the Special Interest Group for Special Educacors (SIGSPED), one of four special interest groups of the International Council for Computers in Education (ICCE).

334 Zientara, P. (1983). Visualtek's device lets visually impaired use Apple computers. InfoWorld, 5(41), 31.

This weekly magazine reports the availability of visualtek's large-print display processor which plugs into the Apple II, Apple II+, or Apple IIe and allows for CRT letters to be magnified up to 16 times their original size. The device aids visually impaired persons on the job, in school, or with personal computers at home.

335 Zuckerman, R. A. (Project Director) (1983-1985). Microcomputer software for individually managed instruction. (Kent State University, Department of Special Education, 401 White Hall, Kent, Ohio, 44242; (216) 672-2477) Grant awarded from the U.S. Department of Education.

The purpose of this project is to develop an authoring system that will enable special education teachers to develop software for computer-assisted instruction for handicapped students. The system will require little or no computer programming knowledge in teachers. The software developed will allow for teacher selection of reading level and input and output modes.

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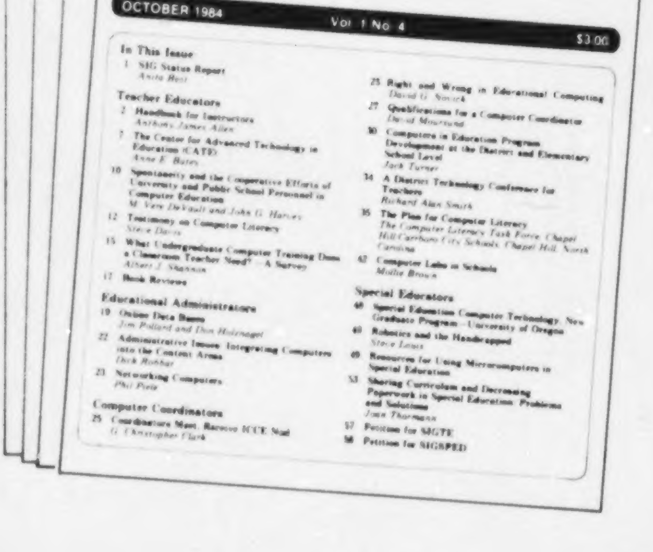

INTERNATIONAL COUNCIL FOR COMPUTERS IN EDUCATION

ICCE

SIG BULLETIN

Serving Special Interest Groups of The International Council for Computers in Education

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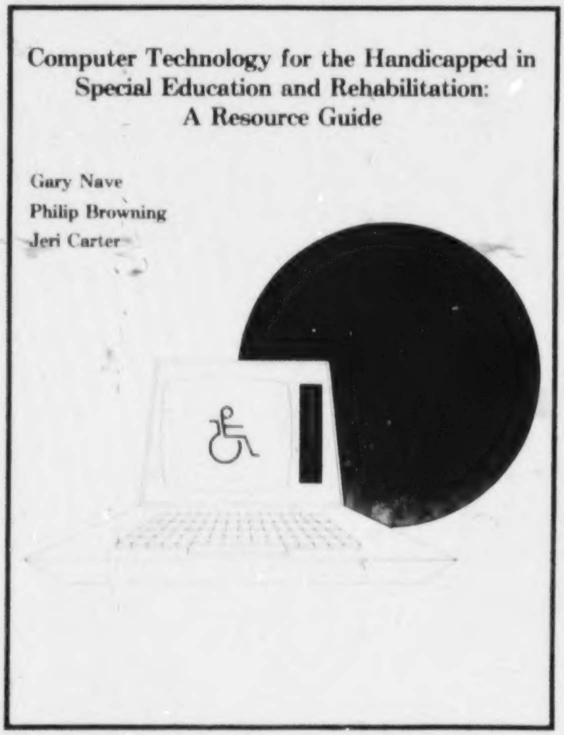
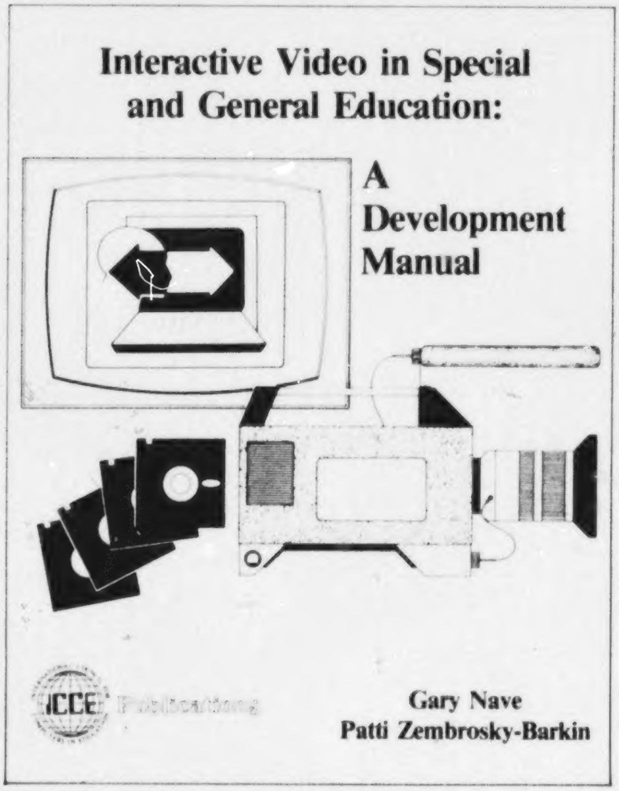


Computer Technology for the Handicapped in Special Education and Rehabilitation: A Resource Guide

Gary Nave
Philip Browning
Jeri Carter

Resource Guide I

This companion piece to *Resource Guide II* contains 191 annotated references related to the application of computer technology in special education and rehabilitation. *Guide I* provides a useful historical perspective of the growth of technological applications for the handicapped, starting from the early days in the 1960s and going through 1982. This library of materials provides an expeditious means for both becoming familiar with the breadth of activities in the area, as well as delving more deeply into specific subject areas of personal interest. An author index and a subject index facilitate quicker searching for materials of interest. For example, specific physical and developmental disabilities subheadings include mentally retarded, learning disabled, blind, deaf, nonvocal, quadriplegic, autistic, emotionally handicapped and cerebral palsied.



Interactive Video in Special and General Education:
A Development Manual

ICCE Publications

Gary Nave
Patti Zembrosky-Barkin

This Manual is intended as an introduction to the application of interactive video instruction for both special education and general education audiences. This educational technology is sometimes referred to as computer assisted video instruction (CAVI). A series of development steps are discussed within four major categories: instructional design, video production, computer programming and curriculum finalization. This procedure can be applied to any educational content, but is supported in the Manual with specific examples from an actual interactive video (or CAVI) development project at the University of Oregon Rehabilitation Research and Training Center. Also provided is a general overview of different delivery systems and the major educational application areas of interactive video. The Development Manual may serve as a resource book for instructional developers, teachers, trainers or students of advanced instructional technologies.

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